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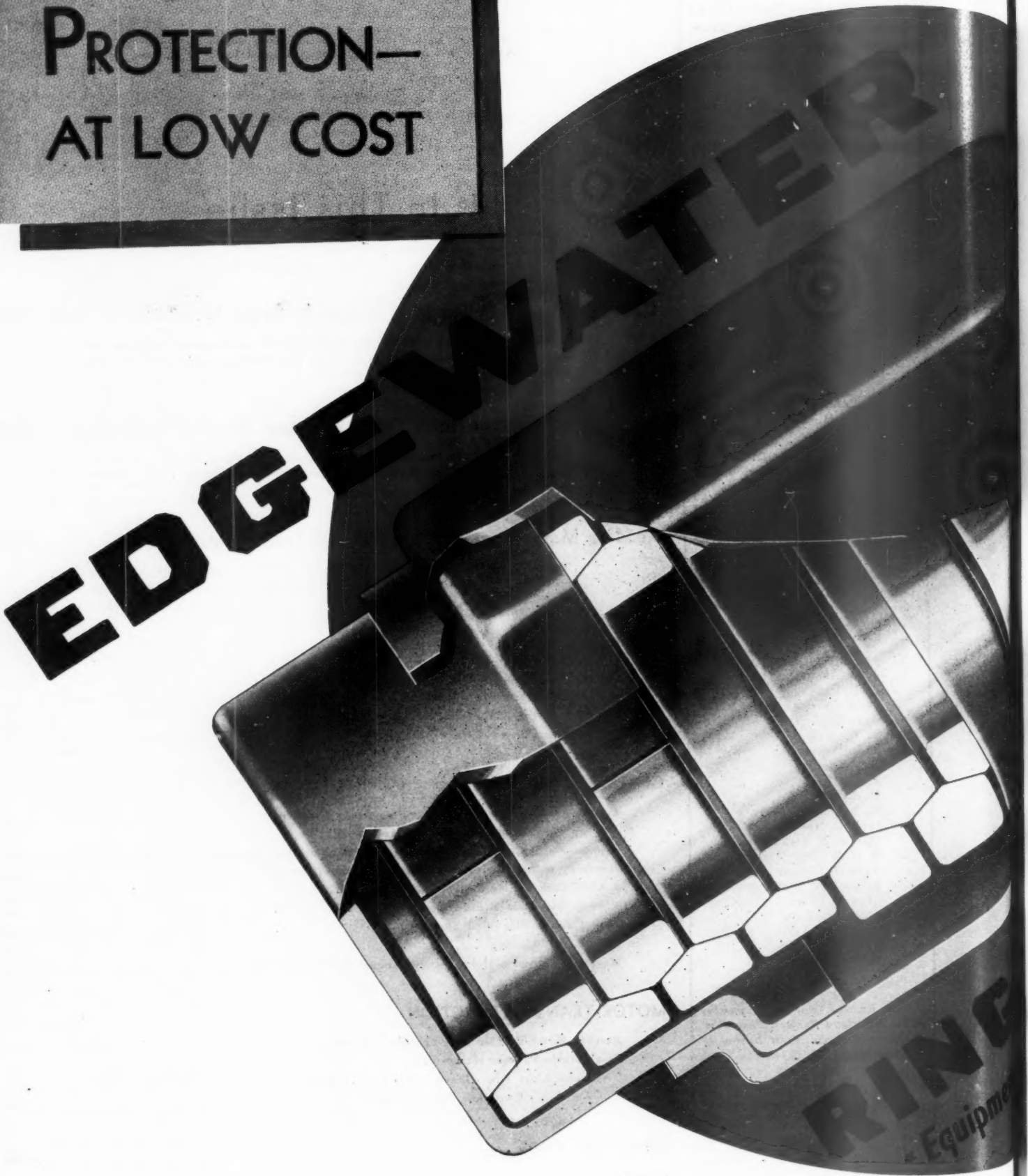
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PROTECTION—  
AT LOW COST





## RAILWAY AGE

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# Effects of Depression on the Railways

The railways are asking for a 15 per cent general advance in freight rates to meet an emergency. The emergency exists partly because of the unfair way in which the state and national governments have dealt with the railways, as compared with competing means of transportation, both before and during the present depression, but principally because of the effects upon traffic and earnings produced by the depression. The year 1929 was one of comparative prosperity for the railways, although their total earnings were less than in either 1923 or 1926, and were declining in the last one-third of the year. The first half of the year 1931 has been a period of severe depression, and traffic has not yet begun to recover. Complete statistics of earnings and expenses are available for the first one-third of this year, and comparison of them with statistics for the corresponding part of 1929 show the devastating effects the depression is producing on the railways. Let us see how the railways would fare during the entire year 1931 if there should be no advance in their rates and their traffic should be as small compared with that of 1929 throughout the year as it was during the first one-third of the year.

### Decline of Earnings and Operating Expenses

The total earnings of the Class I roads in 1929 were \$6,360,000,000. In the first one-third of 1931 they were 27½ per cent less than in the first one-third of 1929. On this basis total earnings in 1931 would be \$1,750,000,000 less than in 1929. They would also be \$970,000,000 less than ten years ago in 1921, also a year of severe depression, and \$1,845,300,000 less than in 1926, the year of greatest total earnings.

Freight earnings in 1929 were \$4,832,000,000. They were 27 per cent less in the first third of 1931 than in 1929. On this basis they would be \$1,300,000,000 less in the entire year 1931 than in 1929. Passenger earnings in 1929 were \$874,000,000. They were 34½ per cent less in the first third of 1931 than in 1929. On this basis they would be \$275,000,000 less in the entire year 1931 than in 1929. Earnings from mail, express, and other sources in 1929 totaled \$644,000,000. They were 26 per cent less in the first third of 1931 than in 1929, and on this basis would be \$168,000,000 less in the entire year 1931 than in 1929.

Let us now turn to operating expenses. In 1929 total operating expenses were \$4,561,000,000. In the first third of 1931 they were 22 per cent less than in the first third of 1929; and on this basis they would be \$1,003,400,000 less in the entire year 1931 than in 1929; \$1,400,000,000 less than in 1923; \$1,046,400,000 less than in the depressed year 1921; and \$2,271,751,000, or almost 40 per cent, less than in 1920, when expenses reached their peak.

Operating expenses are divisible into wages and expenditures for materials and supplies. There have been no reductions of railway wages; but the average number of employees thus far in 1931 has been almost 290,000 less than in 1929. Total wages paid are running 21 per cent less than in 1929, or at the rate of an annual reduction of \$609,000,000. The decline in purchases of fuel, materials and supplies that has occurred is indicated by the fact that the expenditures for them being charged to operating expenses are running at the rate of \$400,000,000 a year less than in 1929.

The principal subdivisions of operating expenses are those for transportation, which can be reduced almost in proportion to the decline of traffic without injury to the physical properties, and those for maintenance, which cannot be greatly reduced without deterioration of the properties and ultimate deterioration of service. In the first third of 1931 maintenance expenditures were 26 per cent less than in 1929, at which rate of reduction they would be \$540,000,000 less in the entire year 1931 than they were in the entire year 1929.

### Net Operating Income in 1921 and 1931

In 1929 the net operating income earned was \$1,275,000,000. In the first third of 1931 net operating income was 60 per cent less than in 1929. On this basis the net operating income earned during the entire year would be only \$510,000,000, or about \$765,000,000 less than in 1929. The year 1921 was, measured by financial results, the worst in the history of the railways of the United States up to that time, but the net operating income earned was \$616,000,000, and produced a return upon property investment of 2.87 per cent. The investment in railway properties is now \$6,000,000,000 larger than in 1921; and if the net

operating income earned in the entire year 1931 should be relatively no larger than it was in the first third of the year it would be about \$106,000,000 less than in 1921, and would yield a return of only  $2\frac{1}{4}$  per cent upon property investment. This would be much the smallest percentage of return ever earned by the railroad industry, excepting in 1920, during six months of which net return was guaranteed by the government.

The figures given above demonstrate certain facts. The enormous reductions that they show have been made in operating expenses demonstrate not only that the railways are being economically operated, but that such severe retrenchments have been made that the physical properties are deteriorating, although their deterioration has as yet had no bad effects upon service. The average return being earned is so small as to demonstrate that most railways are not earning their fixed charges, and, unless their traffic soon improves or they are granted an advance in rates, will have to retrench still more severely if they are to avoid bankruptcy. The reduction of the annual payroll at the rate of \$610,000,000 a year, which has been accomplished by laying off about 290,000 employees, has largely destroyed the purchasing power of these employees and is having a proportionate adverse effect upon general business.

The reduction of operating expenses indicates a curtailment at the rate of \$400,000,000 a year in purchases of fuel, materials and supplies from other industries, but, the reduction of purchases from other industries has been much larger than this, because capital expenditures as well as operating expenses have been drastically curtailed this year, and the bulk of capital expenditures, which amounted in 1930 to \$873,000,000, consists of purchases of equipment, materials and supplies from other industries. The unemployment caused in other industries by the drastic curtailment of railway purchases undoubtedly now exceeds the amount of unemployment caused on the railways themselves by the retrenchments of all kinds which the tremendous decline in their earnings has forced the railways to make.

#### What Is the Public Interest?

The public interest is paramount. There can be no justification for an advance in rates for the benefit of the railways if it will not also benefit the public. As we have pointed out before, freight rates are only a part of the costs of industry and commerce, and affect only in small measure the prices that must be paid by consumers for most commodities; but they are the source of about 80 per cent of the revenues of the railways. The increase in their revenues for which the railways are asking is needed to enable many of them to pay their fixed charges. It would save them from the necessity of still more drastically reducing their expenditures, and a still more drastic curtailment of railway expenditures would not only tend to make general business worse and prolong the depression, but

would result in a deterioration of railway properties which in a comparatively short time would make it impossible for the railways to continue to render efficient and safe service.

Fast, dependable, and safe service cannot be rendered by broken-down railways. Because of the efficient and safe service rendered within recent years the public may have forgotten this; but the records of earlier years, when the railways were universally denounced for delays and accidents in the transportation of both passengers and freight, demonstrate it only too conclusively.

The railways are in great need of the increased revenues for which they have asked to enable them to pass through the present crisis without disasters that would shake the entire financial structure of the country, and to keep their properties in physical condition that will enable them to render efficient and safe service when general business revives. They are presenting their case frankly and fully to the public and the public's tribunal, the Interstate Commerce Commission, and the commission should be governed in passing upon it entirely by consideration of the interest of the public as a whole.

## Automotive "Facts and Figures"

The National Automobile Chamber of Commerce recently issued its 1931 edition of "Facts and Figures of the Automobile Industry," which is of interest to the railroads in that it indicates the magnitude of the highway transportation machine in 1930. Passenger car registrations increased from 17,496,420 in 1925 to 23,042,840 in 1930. For the first time, however, there was a decrease in passenger car registrations, those of 1930 having been one-third of one per cent less than those of 1929. Motor truck registrations increased from 2,440,854 in 1925, to 3,480,939 in 1930, the increase in 1930 over 1929 having been 3 per cent.

The N.A.C.C. booklet quotes the U. S. Bureau of Public Roads as stating that  $5\frac{1}{2}$  per cent of all trucks registered in 1930 were common carriers, including 1.05 per cent interstate common carriers and 4.45 per cent intrastate common carriers. The percentage of trucks operated in contract service is represented as 8.7, and the percentage of privately-owned trucks as 85.8.

Apparently the peak in independent common carrier motor bus operation was reached in 1928. According to "Facts and Figures," 37,932 motor buses were operated by independent common carrier lines in 1928, 35,640 in 1929, and 34,684 in 1930. Five thousand motor coaches were operated in interstate service in 1930, as compared with approximately 6,000 so operated in 1929.

## The Superintendents' Association—A Challenge

No organization in the railway field possesses greater possibilities for service to its industry than the American Association of Railroad Superintendents. The only organization dealing with the problems of railway operation as they arise in the actual movement of traffic, it faces a responsibility second to no other association. Its work deals with the production of transportation—the real function of the railway industry, to which all other activities are auxiliary. The activities of the transportation department involve the expenditure of hundreds of millions of dollars, primarily for labor—from which there is no recovery value as scrap. It faces, to a greater degree than almost any other department today, the necessity for further economies in its operations. All of these considerations point to the need for an active organization in this field which will serve as a medium for the free and full interchange of ideas regarding current problems and means for their solution.

The American Association of Railroad Superintendents is an old organization. The convention at St. Louis on June 9-12 was its thirty-eighth. Yet the association does not enjoy the standing of numerous other organizations many years its junior. This is due to a number of reasons, of which the most important in recent years has been the widespread inertia among its members—an unwillingness to work with the diligence that has characterized the members of some other associations in the railway field. Its reports all too frequently have been academic rather than constructive. The discussion from the floor has frequently been equally elementary. As a result many of the more alert and efficient operating officers have found the conventions not worth their time and the attendance has been confined more and more to junior officers and to representatives of the smaller properties. In other words, officers, committeemen, and members alike have failed to take the association seriously enough to do the work that is essential for the success of any organization.

During the last year a change has become evident. The officers have taken their responsibilities more seriously. Some of the committees did more constructive work than has been usual in the past. Those attending the convention, while less than 10 per cent of the membership, showed more interest in the reports and a greater earnestness of purpose than at other recent meetings. As a result the convention took on a more serious air—one that gives promise for the future, if followed up.

To bring the association to the full measure of its possibilities requires leadership of a high order, for this is a day of rapid development of transportation methods. We believe that it has this leadership. Its success requires the selection of committees and of

subjects for study that are of direct concern to operating officers today. This imposes a responsibility upon the association's officers. Its success also requires a willingness to work on the part of the rank and file of the membership that was evident to an encouraging degree at the St. Louis meeting, but that must become more general to cause the attendance at the meetings to increase to the extent that the importance of the association warrants.

A start has been made in the right direction. Continued energetic action is necessary if the association is to advance to the high place in the railway world that it ought to attain.

## Faster, Co-ordinated Service

A most significant development of recent months, and one which should not fail to have a marked effect on the competition with motor truck transportation, is the speeding up of merchandise freight trains between important shipping centers. Equally important is the fact that many of these faster merchandise trains are aided in reducing time in transit by motor trucks which render pick-up and delivery service at terminal and intermediate points. A number of middle western and western roads now offer pick-up and delivery service for l.c.l. freight, and in nearly every instance the establishment of such service has been marked also by the speeding up of connecting train schedules, so that over-night delivery as far as 300 miles from the shipping point is not uncommon.

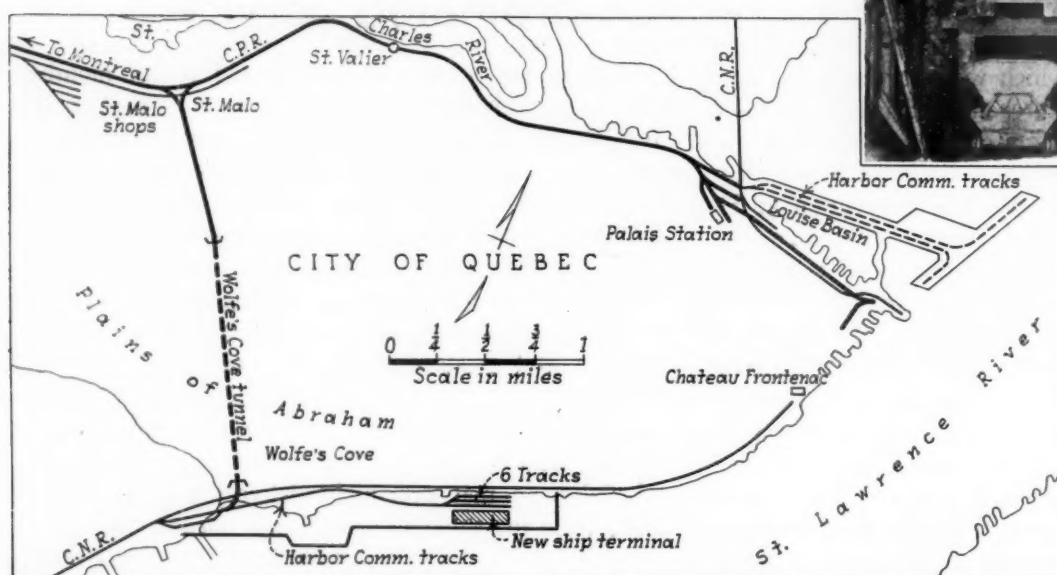
Recently two notably fast merchandise trains have been placed in service by eastern roads, acting jointly. One of these operates on an over-night schedule between Boston, Mass., and Baltimore, Md., running via the New Haven and the Pennsylvania. On June 15, as described in the Motor Transport Section of this issue, the Boston & Maine and the New Haven placed in service an over-night freight train between Portland, Me., and New York. Motor trucks operated by the Boston & Maine Transportation Company and the New England Transportation Company, subsidiaries respectively of the Boston & Maine and the New Haven, connect with this train at a number of concentration points, enabling shippers at many points in New England which are not located on the main line of this train to take advantage of its fast schedule.

Fast service—faster than motor trucks can offer—should be helpful in meeting highway competition. There are other reasons why shippers patronize motor truck transportation, but over-night deliveries to rather distant points is one of the most important of such reasons, and when railroad deliveries are faster than motor truck deliveries an important advantage of the motor truck is removed.



# Canadian Pacific Drives Mile Tunnel to Reach New Ship

Constructs line under city of Quebec, Can., in 11-month race with completion of "Empress of Britain"



(Above) Breakdown Work Showing Platform Used and Timbering Necessary—  
(Left) Sketch of Rail and Harbor Facilities at Quebec

**C**OINCIDENT with the opening of new ocean port facilities along the St. Lawrence river waterfront at Quebec, Que., on June 1, with the first docking of the Empress of Britain, the new 758-ft., 42,500-ton Atlantic passenger steamship of the Canadian Pacific, that road put in service a 1½-mile branch line leading directly to ship side, which, although involving the construction of a single-track tunnel a mile in length under the city, was rushed to completion in about 11 months. While the whole project at Quebec is of interest, including the new steamship terminal and the new passenger ship, which is said to be one of the finest in Atlantic service, the major part of this article will deal with the new line and, more particularly, with problems and methods in constructing the tunnel.

## Problem to Reach New Ship Terminal

Since about 1880 the major dock and wharf facilities of the port of Quebec have been located at the confluence of the St. Charles and St. Lawrence rivers, along the north side of the city in what is called the Princess Louise Basin. Until recent years these facilities were quite adequate, but with the construction of the Empress of Britain, it was obvious that harbor improvements would have to be made. After extensive

studies it was decided that improvement and extension of the harbor facilities should be carried out up the St. Lawrence river, towards Wolfe's Cove, where better shelter was afforded than at the present harbor, and where a minimum of dredging would be necessary to give deep water directly alongside the docks.

Without rail access to the site of the new ship terminal, the Canadian Pacific decided to construct a branch line and to rush its completion to meet the date of arrival of its new ship on her maiden voyage. The final route selected for the line extends from a point on the main line about 2½ miles west of the Palais station at Quebec, practically south through the high ridge on which the city is built, between the valleys of the St. Charles and St. Lawrence rivers. The new line, which is 1½ miles in length, leaves the main line at an elevation of 60 ft. above the St. Lawrence, and, after practically a level approach of about 2,300 ft. to the north face of the ridge, passes through the ridge in a 5,350-ft. tunnel on an 0.8 per cent grade, emerging on the other side about 28 ft. above the river level. From the south portal of the tunnel the line swings to the west along the water front to a connection with the Harbor Commissioner's railway, which, in turn, extends to the site of the new ship terminal.

The tunnel extends through a section of the ridge which rises as high as 350 ft. above the St. Lawrence, and penetrates both Quebec City limestone and shale. The limestone was found to be self-sustaining during construction and did not require timbering, but the shale required timbering. Both rocks are soft and subject to weather on exposure, which made it necessary to line the tunnel with concrete throughout.

The finished lining section has vertical side walls and a semi-circular arch top with a radius of 8 ft. The width of the section is 16 ft. and its maximum height above base of rail measured at the center line is 22 ft. 6 in.

In constructing the tunnel, work was undertaken from both ends, working in two shifts, and the bottom heading method was adopted, primarily because of the fear of excessive overbreak. The headings driven were about 12 ft. high by 14 ft. wide, and the drilling for each shot consisted of about 24 holes, 8 ft. to 10 ft. deep. Delayed explosion, with seven delayed actions, was used in the work, about three pounds of powder being required per cubic yard of rock removed. With usually one shot per shift, the headings were advanced at the average rate of about 16 ft. a day.

After the headings had been advanced several hundred feet, it became necessary to use a blower for clearing away the gases after each shot to enable the men to get back to work without delay and without ill effects. Later, water was also sprayed on the muck heaps after each shot, this having a tendency to expel the gases and to allay the dust.

#### Effective Mucking Equipment Used

Mucking at both ends of the tunnel was carried out in practically the same manner. The muck was first pulled back from the face to afford space for the drillers, and was then loaded into 2½-yd. narrow-gage, side-dump cars which were handled by five-ton electric mine locomotives in trains of five or six cars. Handling of the muck in the headings was done effectively by a combination platform and drag arrangement, which

permitted the direct loading of the muck without hand work. In this arrangement, the platform was a steel frame structure with a steel ramp leading up to the deck and with trap doors in the deck itself. This structure was mounted on wheels so that it could be advanced in the heading as the work progressed, and the height of the platform was such that the muck cars could be pushed directly beneath it for loading.

The other essential part of the mucking equipment consisted of a specially designed drag unit which was used to pull the muck back from the heading face and up on to the loading platform. This unit had steel teeth on one edge for handling the coarser material and a steel plate on the other edge for cleaning up the finer material, the back being a curved steel plate to permit it to be dragged back over the muck pile for reloading.

The drag was attached to an endless cable and was hauled back and forth by a 50-hp., double-drum electric hoist mounted on the loading platform, the forward end of the cable passing over a pulley which was secured to eyebolts set in the rock and moved forward as the work progressed. With this equipment, the muck was dragged directly on to the mucking platform and into the 2½-yd. muck cars, as many as 20 of these cars being loaded in an hour.

Breakdown within the tunnel took place from about 300 ft. to 500 ft. back from the heading face, this being done from a timber platform about seven feet high, constructed of 12-in. by 12-in. timbers. This platform not only facilitated the drilling and blasting work in the formation of the full section of the tunnel, but also afforded a platform from which the breakdown could be loaded directly into cars beneath, either through trap doors provided, or by shoving it over the ends. Drilling for the breakdown varied with the quality of the rock and other conditions encountered, and the blasting in this work required about 1½ lb. of dynamite per cubic yard of material removed.

Normally, the platform extended through a distance of about 100 ft., the outer end being dismantled as the breakdown was completed and the material reused in extending the platform inward in the tunnel. In addition to its function as a loading platform and to facilitate breakdown operations, the platform also afforded a means of protection to workmen passing back and forth in the heading, and in keeping open the narrow gage line used in removing material from the heading.

For about 2,500 ft. from the north portal, through which shale was encountered, it was necessary to follow up the breakdown closely with a complete timber lining to prevent the falling of rock outside the section required and to protect later operations. The timbering consisted of 12-in. by 12-in. plumb posts with 12-in. by 12-in. foot and wall plates, and five-segment arch rings, also constructed of 12-in. by 12-in. timbers. These rings were placed 4 ft. center to center and were lagged where necessary with 3-in. by 6-in. timbers, behind which timber dry packing was used. Ordinarily, the lagging pieces were spaced three inches apart with the idea that any pressures developed could be relieved by picking out the rock from behind the lagging, and also to permit the free flow of concrete in the construction of the lining, back through the dry packing to the undisturbed rock face.

#### Effective Lining Method Used

Because of the character of the rock encountered, the tunnel was lined throughout with concrete. Where timbering had been necessary, the lining was reinforced with steel bars and was made 2 ft. 3 in. thick to the back face of the plumb posts and arch timbers; where



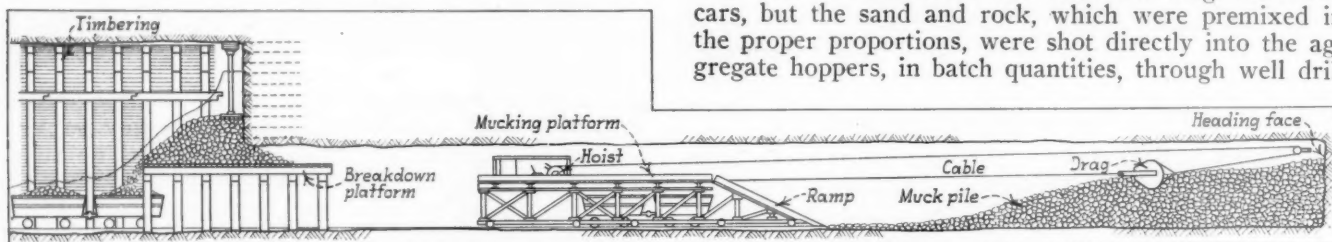
View of One of the Concrete Plants Employed in the Lining Work





Interior of the First Floor of the New Steamship Terminal Building

the rock was self-supporting and the concrete was needed simply to prevent weathering of the rock, plain concrete, 12 in. thick was used; and where the rock was self-supporting, but where it was expected that slight stresses might be set up as a result of frost action or other cause, reinforced concrete, 1 ft. 3 in. thick was used. At the south end of the tunnel, where the lining was carried out beyond the face of the rock cliff a sufficient distance to permit the rerouting of a street



Sketch Showing Methods and Equipment Used in the Heading and Breakdown Work

over the tunnel to preclude a crossing of the tunnel track at grade, the lining was made 2 ft. 6 in. thick and was heavily reinforced. All of the concrete used in the lining was 1-2-4 mix, with the water content carefully controlled.

Construction of the lining progressed from both ends of the tunnel at the same time and was put under way even before the breakdown work was completed. With the exception of the bench walls, which were



The North Portal of the Completed Tunnel

placed by hand methods, the entire concrete lining was constructed by using 40-ft. sections of Blaw-Knox adjustable steel forms, mounted on rails, and Ransome concrete placers.

The preparation of the concrete for shooting into the lining was done at both ends of the tunnel and at three points within the tunnel. Two of the points within the tunnel were about 1,200 ft. and 2,500 ft. from the north portal, respectively, and the third point was about 1,400 ft. from the south portal. Two plants were used in the work and were moved to the different points as the work progressed. These plants consisted essentially of a one-yard mixer and a pneumatic concrete placer, together with the necessary bins and hoppers.

The set-up of the plants at the three inside mixing points was both effective and interesting. At each of these points, the equipment was mounted on a tower of heavy timber construction, with two main platforms, the lowest of which was of sufficient height above the tunnel floor to permit the free movement of muck trains beneath it. The lower platform carried the concrete mixer, while the upper platform was used for the storage of cement and supported an aggregate hopper which discharged through a chute directly into the mixer beneath. The concrete placer was located on the floor of the tunnel to one side, and received the concrete shots, of predetermined size, directly from the mixer.

Cement was delivered to the inside mixing stations in cars, but the sand and rock, which were premixed in the proper proportions, were shot directly into the aggregate hoppers, in batch quantities, through well drill

holes with 6-in. metal liners, put down from 185 ft. to 215 ft. through the rock ledge, from a roadway above. This method of delivering the aggregate to the mixers not only facilitated its handling, but also reduced to a minimum interference with the muck trains by the concreting operations.

The concrete was shot into the lining through 6-in. steel pipe by air supplied by compressors at each end of the tunnel, the pipe extending along the floor of the tunnel and then being carried up to the top of the form bulkhead in each case. Bends in the pipe line consisted of 24-in. sections of pipe with  $22\frac{1}{2}$  deg. of curvature, these sections being made up with an upper and a lower half, bolted together through flanges. The lower half of each section was constructed of manganese steel to increase its resistance to wear, but even this material wore down and had to be built up electrically with Stelite.

#### Trouble With Water Overcome

The major difficulty encountered in the lining work was with the seepage of water through the rock, which, throughout a considerable length of the tunnel, was sufficiently severe to cause apprehension concerning the ability of the green concrete to set up without becoming over watered and porous. At these points, sheet tin was applied in the arch back of the timbering, and in some cases back of the plumb posts, to shed the water and to give the concrete a chance to set up. Approximately 10,000 sq. ft. of tin was used for this purpose. All of



the seepage water in the finished tunnel is brought from behind the lining through weep holes at the bases of the side walls, and is readily carried to the south end of the tunnel in the sloping side ditches.

At a few points where leakage occurred through the lining in spite of the precautions taken, Sika waterproofing was applied to the inside face of the lining and proved effective in stopping the flow of water.

In the construction of the tunnel, 98,640 cu. yd of rock was removed, in addition to approximately 13,290 cu. yd. of grading for that portion of the branch line outside of the tunnel. Nine hundred and seventy-seven thousand feet of lumber were used in the timber work and 28,832 cu. yd of concrete was used in the lining and portals.

To expedite movements through the tunnel and to insure their safety, an electric interlocking operated by a centralized traffic control type machine was installed on the new line, together with color light signals of the searchlight type, and all trains are moved by signal indication only. The control machine, which has no mechanical locking between levers, is located in a new tower constructed near the turnout of the new line from the main line. This machine has 50 interlocking functions and, in addition to controlling the signals over the new branch line and the protection at two street railway crossings and one steam railway crossing, also controls nine switches, including the wye junction switches of the new line, a junction switch between the Canadian National and the main line of the Canadian Pacific, and the switches of two crossovers between these lines.

#### Large Terminal Building Provided

The new steamship terminal at Wolfe's Cove, which lies directly alongside the river, back of a new 4,300-ft. quay wall, consists at present essentially of a large two-story building, approximately 1,380 ft. long by 100 ft. wide, served by six tracks along its land side, with two intermediate shed-covered platforms which are located between pairs of tracks. The building is a steel frame structure with brick ends, enclosed for the most part on the sides with horizontal turnover doors, these doors extending continuously along both sides of the first floor and along the water side of the second floor. Both floors of the building are of concrete, the first resting on a fill, while the upper floor is carried on a steel floor system. The roof, which is of pine, protected with built-up roofing, is carried on light steel trusses, supported by two interior rows of columns and the side wall columns.

The first floor of the building is to be used primarily for the handling of heavy shipments, the transfer of which between rail and ship, and vice versa, can be made directly across the width of the building. A wide concrete driveway ramp at the west end of the building also admits trucks directly to the main floor, so that a minimum of auxiliary trucking with hand and storage battery trucks will be required in the freight handling operations.

The upper floor will be used exclusively for the handling of passengers, baggage and package freight. The baggage and freight will be moved between the floors by either the elevators or package chutes provided, while passengers between the ships and trains, and vice versa, will use either of two enclosed bridges which connect the second floor with stairways leading to each of the two train platforms. Thus, passenger interchange between ships and the trains of the Canadian Pacific is entirely under cover and a matter of only a few hundred feet at most.

The ship terminal was constructed under the direction of the Quebec Harbor Commission, while all of the railroad work, including the tunnel, was done by the Canadian Pacific under the direction of J. M. R. Fairbairn, chief engineer, and D. Hillman, engineer of construction. The general contractor handling the railroad work was the Dominion Construction Company, Montreal, Que.

## Railway Development Association Meeting



© Bachrach  
Gayle W. Arnold

THE twenty-third annual meeting of the American Railway Development Association was held June 17-19, inclusive, at the Hotel Benjamin Franklin, Philadelphia, Pa. The first day was given over to a general session while on June 18 the Agricultural and Industrial sections met separately to discuss their respective problems. At the business session on June 19, Gayle W. Arnold, industrial agent of the Baltimore & Ohio at Cincinnati, Ohio, was elected president for the ensuing year; Mr. Arnold, who had been first vice-president, succeeds in the presidency Russell G. East, agricultural agent of the Pennsylvania at Shelbyville, Ind. Other officers elected were: First vice-president, C. A. Radford, publicity manager, Cleveland, Cincinnati, Chicago & St. Louis, Cincinnati, Ohio; second vice-president, J. B. Hilton, industrial commissioner of the St. Louis-San Francisco at St. Louis, Mo.; secretary-treasurer (re-elected), Arthur W. Large, general agricultural agent of the Chicago, Rock Island & Pacific at Chicago. It was decided to hold the 1932 annual meeting at Louisville, Ky.

Following the address of welcome by Edgar D. Hilteary, vice-president in charge of freight traffic of the Reading, the meeting got underway with the reading of a paper entitled "Marketing Studies in New York City" by Earl French, secretary of the New York Food Research Council. David Lawrence, editor of the United States Daily, speaking at the luncheon on "A Long Look Ahead in Government and Business" declared that a return to prosperity depends largely upon interchange of commerce with foreign countries and predicted that when prosperity does come again the United States will find itself in the position of banker for the world.

#### Co-operation Urged

The remainder of the general session was consumed by papers and discussions on the mutual interests of railroads, realtors, chambers of commerce, and regional councils in agricultural and industrial development. Gerrish Gassaway, manager of the Wilmington (Del.) Chamber of Commerce and secretary-treasurer of the National Association of Commercial Organization Secretaries, urged upon railroads and chambers of commerce a closer co-operation and a better understanding if they would promote their mutual interests by bringing new industries into their common territories. Mr. Gassaway conceded that one obstacle to co-operation

is the violation of confidences imposed by railway development officers in chamber of commerce secretaries which violations have caused "the client embarrassment in the trade and frequently the defeat of well-laid plans through competitive reaction." He added that while this difficulty has not been entirely overcome, "fortunately the majority of chamber of commerce secretaries can be trusted with the most confidential details of expansion plans and follow the policy of making no announcement of any nature until the same is done by the industrial prospect himself."

Turning to a discussion of railway industrial development work, Mr. Gassaway held that "too frequently railroad executives have set up well-organized, well-managed, industrial and agricultural departments and failed to provide sufficient personnel or budget to operate them at maximum efficiency." The speaker continued to cite instances of delay and "red tape" encountered in obtaining decisions from various railroad departments. The way out of these "unsatisfactory conditions surrounding industrial development," he concluded, is to adopt and adhere to a policy "of rental or sales values, of switch track installations, of tariff flexibility and make it more expeditious for chambers of commerce to get decisions."

Other speakers who participated in the foregoing discussion were T. W. Hulme, vice-president of the Pennsylvania in charge of real estate, valuation and taxation, and James Carey Martien, realtor, of Baltimore, Md.

A. B. Graham, subject matter specialist of the United States Department of Agriculture extension service, spoke at the meeting of the Agricultural section on methods to be used in securing the adoption of new practices. Illustrating his talk with a series of charts, Mr. Graham discussed the selection of community leaders for a campaign, the basis of proper appeals to such leadership and the need for co-operation between business and extension service workers. His address was followed by the reading of a paper prepared by Dr. Firman E. Bear, director of agricultural research, American Cyanamid Company, New York City.

#### Transport and Industrial Locations

In the meeting of the Industrial section, F. L. Ayres, industrial agent of the Central of New Jersey at New York, read a paper on "Rail Rates, Trucks and Water Transportation, and Their Effect on Railway Industrial Locations." It was in general Mr. Ayres' conclusion that, because there are so many other factors entering into the selection of an industrial site, "it seems reasonably within the bounds of possibility that the determination of industrial locations will be but slightly affected by the increasing use of waterways and trucks."

In his discussion of waterways, Mr. Ayres quoted total waterway transportation costs as opposed to water carrier rates and contrasted these with railway rates in order to "dimly outline the character of the competitive situation as it exists between the rail and water agencies for the carriage of freight." He concluded, however, that because waterways, except in a limited number of cases, do not appear to be available as avenues for the wide distribution of goods, they are, and for some time to come probably will be "but minor factors in affecting the placement of industries."

With the development of the motor truck, Mr. Ayres found small producers have tended to locate within trucking distances of their large consuming markets whereas large producers tend to move away from the densely populated areas. A natural result of the latter would be the utilization of distribution warehouses within the trucking areas of consuming markets. "This

should be a crumb of comfort to the railroads in its promise of an inbound haul of the raw materials and an outbound haul of the finished products of large scale producers," Mr. Ayres observed.

Other proceedings at this Industrial section meeting included the report of the zoning committee and papers on the relation between agricultural and industrial development by E. F. Reed, industrial agent, Boston & Maine, and on the value of advertising in industrial development work on railroads by E. J. Israel, Jr., industrial agent, Pennsylvania. The program for the afternoon of June 18 included trips about Philadelphia with market studies for the Agricultural section and industrial studies for the Industrial section.

The speaker at the general session on June 19 was Dr. John Lee Coulter, member of the United States Tariff Commission, who discussed the "Relation of Domestic and Foreign Commerce to American Railroad Development."

It was Dr. Coulter's opinion that "the tremendous decline in railway revenue is in no way (or at least only very slightly) connected with the world-wide economic depression through which we are now passing." He first took up the effect of the decline in foreign commerce on railway revenue and quoted statistics to support his conclusion that the loss to railways from this source is slight since "the decrease in 1930 under 1929 would represent less than two-tenths of one per cent of the revenue freight moved."

#### Bases of Railroad Difficulties

Dr. Coulter found the present plight of the railways due to: (a) The decline in ton-miles of revenue freight due to competition with trucks, pipe lines, inland waterways, etc.; (b) the decline in ton-miles of revenue freight due to the present world-wide economic depression; (c) the decline in ton-miles of revenue freight due to the shifting and other changes in industry, agriculture, etc.; (d) the decline in revenue per ton-mile of freight handled; (e) the decline in passenger revenue. He discussed each of the foregoing in turn.

The solution to the problem of competition with other agencies of transport, he said, "points either toward permitting railroad companies to enter these fields, or lower taxes, or regulation of these competitive fields in the same manner as railroads are regulated, or along other equitable lines." As to the problem attending the effects of the depression, the speaker thought that "this calls for the setting-up of a reserve in years of large tonnage of revenue freight to insure earnings during years of small tonnage." To accomplish this latter, he said, an appeal should be made to Congress to rectify any defect in the existing regulatory law.

The fourth problem—the decline in revenue per ton-mile of freight handled—Dr. Coulter considered as one "to be worked out between the railroads and the Interstate Commerce Commission." He knows of no solution to the problems attending passenger traffic losses "other than to hold all that is possible and make up the decrease through freight revenue."

With next a survey of the effects of the decline in railway employment on the general business situation Dr. Coulter continued to a discussion of the changes in industry which have brought new burdens to the railways. In this connection he cited examples of industrial shifts to substantiate his conclusion that "unquestionably the American railways would be justified in setting up large research departments to fully develop and analyze the reorganization of industry, and the bearing of this upon the rate structure to the services performed by the railways."



# Membership in Claim Agents Association Valued at Over \$2,000

Extended interchange among carriers in settlements  
urged as a measure of economy

**T**HE value of a membership in the Association of Railway Claim Agents was placed at \$2,500, by one railroad which saved this amount in handling off-line adjustments through the claim departments of other railroads during two years. This elimination of expense in sending adjusters off the line was described by J. S. Palmer, general claim agent of the Chicago, Rock Island & Pacific at the forty-second annual meeting of the Association of Railway Claim Agents at Toronto, Ont., on June 17 to 19. The meeting, over which President Frank Wenter, Jr., general claim agent of the Chicago & North Western, presided, was attended by 250 representatives of claim departments of railroads in the United States and Canada, and had as its guests the Hon G. S. Henry, Premier of Ontario, and J. C. Caviston, secretary of various divisions of the American Railway Association. The program of the meeting included the discussion of various topics related to claim work and the consideration of reports of various committees. Louisville, Ky., was chosen as the place for the annual meeting in 1932, while the selection of a date in May was left to the executive committee.

The officers elected for the ensuing year are as follows: President, Frank R. Haney, general claims adjuster of the Canadian Pacific at Montreal, Que.; vice-presidents, Frank Hruska, chief claim agent of the New York Central at Cleveland, Ohio; H. L. Dunham, general claim agent of the Chesapeake & Ohio at Richmond, Va.; and Herbert A. Rowe, claims attorney of the Delaware, Lackawanna & Western at New York; and secretary-treasurer, H. D. Morris, district claim agent of the Northern Pacific, at St. Paul, Minn., re-elected.

## Committee Reports

The Grade Crossing committee, of which H. A. Rowe, claims attorney of the Delaware, Lackawanna & Western, was chairman, presented an extended report on grade crossing accidents and offered several suggestions for improvement. It recommended that crossing watchman be dressed in uniforms so that they can be more easily recognized by motorists and as an added protection to the watchmen. The committee also urged the use of the uniform laws adopted by the National Conference on Street and Highway Safety, and that state and municipal governments enforce the same discipline at highway crossings as is administered in cases of violation of traffic rules at street intersections. The committee felt that since the passing of the horse and buggy has eliminated the necessity for frequent grade crossings, steps should be taken to eliminate many of the unnecessary grade crossings that now exist.

The personnel of the Action committee, of which O. G. Brown, assistant general claims attorney of the New York Central, was chairman, suggested that an effort be made to induce various advertisers to co-

operate in reducing accidents on railroads by including safety messages in their advertisements. The Ethics committee, of which H. E. Kane, chief claim agent of the Pennsylvania, was chairman, reported that progress has been made in compiling a code of ethics for the association and that the completed code will be presented at the meeting at Louisville.

Following the report of the Publications committee, the association voted to expand the publication of decisions. Each month important decisions rendered in various courts are summarized and published in the Bulletin, the monthly publication of the association, and are also reprinted on cards which are sent to members for inclusion in card indexes. These card indexes now include important decisions rendered over a period of 17 years and the association voted to republish the decisions in book form at a cost of \$3,000 so each member will have a compact record.

## President's Address

President Wenter suggested that since employment turnover on the railroads is constantly decreasing, members should take advantage of the situation to improve and reform employment methods. By getting one's house in order now, he said, increased efficiency will be available when the heavy increase in employment occurs with improved business conditions. He also urged members to avail themselves more freely of the privilege of calling on members of the association located at a distance for investigations, settlements and pertinent information, and thus benefit by economies resulting from such action.

As a constructive activity for the association, he recommended the development of collections for damage done railroad property. A systematized activity of this sort, he said, carries with it effective safety discipline as well as remuneration for damage done railroad property.

Mr. Wenter also suggested that the association set up a name register or index to be kept in the office of the secretary, the index to be in the nature of an information bureau that can furnish data on a claimant, witness or other person involved in litigation. Under the plan, a member could write to the secretary and the latter could furnish the name of the railroad possessing the information desired. With this plan, the secretary's office would write no letters and keep no file of correspondence beyond the index and the names or initials of roads. After the secretary furnished the information included in the index of names, the correspondence and interchange would be between the respective roads.

## Value of Association to Its Members

The exchange of files and other papers among the various railroads in connection with an injury on the road making an inquiry, at times results in a very marked saving to the railroad involved, according to J. S. Palmer, general claim agent of the Chicago, Rock



Island & Pacific, who spoke on "The Association of Railway Claim Agents and Its Value to Its Members." During the past two years, he said, 41 railroads have rendered the Rock Island service and figuring conservatively, the reasonable value of such services is \$2,500.

Mr. Palmer also cited a saving of \$500 in a suit for an alleged fire involving a considerable amount of money. The trial of the case required the building of a front end of a locomotive and, through the association, the Rock Island was able to borrow a model and thus avoid the expense of constructing it. In another instance, this railroad was able to secure an important witness at a distant point in the west by calling on another railroad, which sent one of its representatives to confer with the witness and induce him to attend the trial. To demonstrate the power of the association, he said, a member has the right and privilege of calling on 112 railroads of the United States and Canada and 1,138 claim men in practically every section, large city or railroad center in the country for help and assistance when needed in the investigation and adjustment of claims presented against his company.

### I. C. C. Accident Reports Do Not Show True Picture

Frank V. Whiting, general claims attorney of the New York Central, stated that the records of accidents, as reported to the Interstate Commerce Commission, do not reflect a true comparison of the conditions existing on various railroads. Without detracting from the accident prevention service that has been carried on for many years, he showed that the major portion of the reduction in the total number of injuries to employees in the last two years, as reported to the commission, was accomplished, and properly so, by retaining employees with minor injuries in the service or getting them back to work without loss of more than three days time in the first ten days following the accident. Incidentally, he said, there are few employees with minor injuries, even with surgical disability, who actually lose time from work. The use of the accident records of the commission are wholly inadequate, he said, and do not properly reflect accident experience. These reports, as used in safety statistics, are limited to employees on duty who die within 24 hr. following an accident. As an example, he showed that in 1930, on the New York Central, there were 87 deaths to employees on duty within 24 hr. and 4 off duty, while the deaths after 24 hr. totaled 24 among employees on duty and 1 for off duty. During the same period, three employees were killed by outside agencies and two were killed in Canada. His record for eight years from 1923 to 1930 for this railroad shows that there were 1,584 deaths, of which only 1,099 were reportable to the Interstate Commerce Commission. In 1930, the deaths totaled 121 and those reportable to the Interstate Commerce Commission only 88. In the same year, the reportable injuries totaled only 2,016, while the railroad actually had over 9,000 employees injured, each involving a surgical disability of one day or more. In addition there were minor injuries reported to the claim department in which there was no surgical disability.

Because of the inadequacy of the figures compiled for the commission, the New York Central has devised a method which provides a broader picture of the results accomplished in accident prevention. Under this plan, each death resulting from an accident to an employee while on or off duty and rightfully on the company's premises, whether the death occurs within 24

hours following the accident or otherwise, is charged against the accident record of the road, subdivision or unit thereof on which the accident happened, in the report for the month in which the death occurred, regardless of the date of the accident. Each personal injury resulting from an accident to an employee while on or off duty and rightfully on the company's premises, regardless of whether the employee is able to continue to perform his duties or loses time from work, is charged against the accident record of the road, subdivision or unit thereof on which the accident happened, in the report for the month in which it occurred.

On this system, during the first four months of this year, 18 employee deaths and 725 injuries were reported to the commission, while under the present plan of counting accidents, the number of employee deaths totaled 25 and injuries 5,717. In compiling statistics under the new plan, injuries to employees that are not accidental, for example some classes of strains, backache and hernias resulting from the performance of customary duties, are not included. Accidents in which no injuries resulted, such as a foreign body in the eye without actual injury, are not included.

### Other Addresses

A paper on the practical co-operation between law and claim departments to bring about efficiency in the handling and settlements of claims and suits was presented by William T. Faricy, general solicitor of the Chicago, St. Paul, Minneapolis & Omaha. This paper was discussed by S. W. Baxter, general attorney of the Cleveland, Cincinnati, Chicago & St. Louis. P. M. Gatch, chief general claim agent of the Illinois Central, spoke on practical economies and operations of claim departments. James H. Amos, claims attorney of the Missouri Pacific, led the discussion. Claim department contacts and the dividends growing out of the same were outlined in a paper by J. J. Donahoe, general claims attorney of the Louisville & Nashville, while Robert Irwin, general claim agent of the Atchison, Topeka & Santa Fe, Coast lines, presented the discussion. The handling of subrogated claims and suits was the subject of a paper presented by C. W. Krohl, general adjuster of the Chicago, Burlington & Quincy. George F. Baker, general adjuster of the Chicago, Milwaukee, St. Paul & Pacific, discussed the subject. J. W. Chatterton, district claim agent of the Great Northern, spoke on the improved treatment of fracture injury cases.

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An Example of Railroad Co-operation With Farmers in Soil Improvement on the Atlanta & West Point

The harrow shown here is turning back into the soil hairy vetch which has a nitrogen content per acre equivalent to the application of more than a ton of nitrate of soda.

# Henry D. Pollard Elected President of Central of Georgia

Vice-president and general manager since 1925 chosen to succeed the late Albert E. Clift

**H**ENRY D. POLLARD, vice-president and general manager of the Central of Georgia since October, 1925, was on June 18 elected president of that road to succeed the late Albert E. Clift. Mr. Clift, a sketch of whose 43-year railroad career appeared in the *Railway Age* of June 6, page 1113, died May 30 at the Central of Georgia hospital in Savannah, Ga., where he failed to rally after an operation for an intestinal perforation caused by an ulcer. Mr. Clift also held the presidency of the Ocean Steamship Company, a Central of Georgia subsidiary; E. R. Richardson, vice-president and general manager of the Ocean Steamship Company, was, at the time of Mr. Pollard's promotion to the presidency of the railroad, also promoted to the presidency of the steamship line.

Mr. Pollard, with the exception of brief intervals, has been in the service of the Central of Georgia since 1898, when he entered its employ as a transitman. Being vice-president and general manager since 1925 he has participated with Mr. Clift in meeting the pressing problems attending drastic revenue and traffic declines during the past two years of business depression. The skillful manner in which operating expenses on the Central of Georgia have been controlled to hold the percentage decline in net railway operating income to a figure approximating the decline in gross revenues was outlined in comparable statistics included with the sketch of Mr. Clift's career in the *Railway Age* of June 6.

Mr. Pollard now comes to direct the consummation of this efficiency program in the past success of which he has undoubtedly had a prominent part.

Mr. Pollard has also been intimately associated with another and perhaps the most important current railway problem—that of meeting the competition of motor coaches and motor trucks and the problems attending the adjustment of services and expenses on branch lines affected by such highway competition. As president of the Central of Georgia Motor Transport Company, motor coach and motor truck operating subsidiary of the railroad, he has directed a plan of co-ordinated operations which have resulted in improved

service and substantial savings to the parent railroad.

Henry Douglas Pollard was born on October 4, 1872, at Aylett, Va. He was educated at the Aberdeen (Va.) Academy, also taking a summer course at the University of Virginia and a night course at Drexel Institute, Philadelphia, Pa. He began his railroad career in 1892 as rodman on the Baltimore & Ohio, going with the Ohio Southern (now part of Detroit, Toledo & Ironton) in February, 1893, as resident engineer at Wells-

ton, Ohio, where he remained until June of the same year. From the latter date until 1894, Mr. Pollard was employed on the topographical survey of the city of Baltimore, then returning to railroad work as assistant engineer, maintenance of way, of the Philadelphia division of the B. & O., which position he held until May, 1898, when he entered the service of the Central of Georgia as transitman in the engineering department at Savannah. He subsequently served consecutively to January, 1911, as assistant engineer, resident engineer, supervisor of track, trainmaster, roadmaster and superintendent for that road.

In 1911 Mr. Pollard went to Brazil, S. A., serving from February to June of that year as inspector general of the Sorocabana Railway at Sao Paulo, Brazil, and from June, 1911, to August, 1913, as inspector general of the Auxiliare Railway at Santa Maria and Porte Alegre. He returned to America in 1913, re-entering the service of the Central of Georgia as valuation engineer, in which capacity he served until

1915, when he was elected president of the Wrightsville & Tennille Railroad, one of the short line railroads affiliated with the Central of Georgia. He became assistant general manager of the Central of Georgia in February, 1918, being promoted to general manager in June of the same year. He was appointed general superintendent of the road in March, 1920, and in January, 1924, was again appointed general manager. Mr. Pollard was appointed vice-president and general manager in October, 1925, serving in that position until the time of his recent appointment to the presidency. He will continue also as general manager. Mr. Pollard was elected a director of the road in December, 1930.



Henry D. Pollard



## I. C. C. Calls for More Specific Rate Proposal

WASHINGTON, D. C.

**T**HE Interstate Commerce Commission has called on the traffic departments of the railways to do a little more work on the proposals of their executives to increase their revenues by a general 15 per cent advance in freight rates before the commission undertakes to pass upon the proposals. Apparently it desires the views of the traffic departments, as distinguished from that of the executives, as to what traffic they believe can bear higher rates at this time with promise that an increase would produce greater revenues. It is known that there has been some difference of opinion on the subject among railway officers, and they had sought to save time by postponing such questions for later consideration in an effort to obtain an early decision on the general question of a rate increase.

Instead of beginning an immediate investigation of the revenue aspects of the case, as requested by the executives, for the purpose of determining whether the roads are faced with an emergency sufficiently great to justify a percentage advance, the commission on June 19 adopted an order directing the roads to inform it within 15 days whether (1) they are prepared, if the authority sought in the application is granted, to initiate increases of all existing freight rates of the measure proposed in the application; (2) or if not, what specific exceptions they propose to make, and particularly whether they are prepared to make increases of the measure proposed in all existing rates on grain and grain products, cotton, other agricultural and horticultural products including livestock, nonferrous metals, iron and steel articles, petroleum and its products, lumber and automobiles, and in all existing class rates; and if not, what exceptions to these rates they propose to make.

Most of these classes of traffic are those on which the commission has recently prescribed general revisions establishing closely-knitted relationships under the Hoch-Smith resolution, including some increases, or has practically completed investigations with a view to such readjustments. They also include some as to which the commission has only recently authorized the carriers to make reductions under the rates prescribed in order to meet motor truck, barge, or pipe-line competition.

This order is preceded by a statement by way of preamble which refers to the commission as "having in mind that the carriers are equipped with traffic departments whose duty it is, among other things, to keep fully informed in regard to industrial and competitive conditions in the districts served by their lines and the ability of the traffic to bear existing or higher freight charges," and "assuming that no increases in freight rates would be initiated which, in the opinion of those departments, the traffic cannot reasonably bear or which for any other cause hold forth no substantial promise that revenue will thereby be increased, and being of the opinion that it is of prime importance, under present conditions, that industries and shippers should not find it necessary to participate in proceedings before the commission with respect to freight rates, if any there be, which the carriers do not in fact intend to increase even though the authority sought be granted."

The order was made public on June 20, following

a general session of the commission on June 19, at which the statement and application of the railroads was ordered received and filed and docketed as Ex Parte No. 103, instead of the regular docket number No. 24,520, which was originally assigned to it when it arrived at the secretary's office on June 17. The case was also set for hearing "as the commission may hereafter order."

It has been understood that the plan to ask authority for a 15 per cent general advance was agreed on by the railway executives only after it had become apparent that they were unable to agree on what exceptions should be made or to work out any comprehensive readjustment of the rate structure in time to obtain any prompt revenue relief. It has also been understood that the railroads did not expect permanently to take full advantage of authority for a 15 per cent advance if granted, but that they expected to work out the exceptions later. The commission, however, apparently wants to know more about their intentions before considering the general question on a revenue basis. It has always been very much opposed to the idea of percentage advances and has frequently held that while the roads have shown themselves entitled to more revenue they have not demonstrated sufficient emergency to justify so "heroic" a measure, as the commission called it in one instance, as a percentage advance.

The order was regarded by some as another indication of the reluctance of the commission to deal with the general rate level on a revenue basis, a reluctance which it was for a time supposed it was the purpose of Section 15a of the interstate commerce act to overcome. Whereas the railways have contended that the amount necessary to produce a fair return has an important bearing on the reasonableness of the rates, the commission has adhered to the theory that its main function is to prescribe reasonable and non-discriminatory rates by themselves, leaving it to the normally-expected growth in traffic volume to produce "as nearly as may be" a fair return in the face of a decrease of nearly 18 per cent in ton-mile earnings from 1921 to 1930.

Moreover, the commission apparently had some doubt as to the unanimity of the railroads in asking for an advance, because it ordered "that any steam railroad carrier which desires to avail itself of the petition" filed by J. J. Pelley, H. A. Scandrett and W. R. Cole, "in their representative capacity shall cause its written appearance to be entered with the commission through its officer or attorney thereunto duly authorized, or by a registered practitioner before the commission." Any other carriers by railroad or by water may in like manner cause appearances to be entered for the purpose of becoming parties to the proceeding.

### Rail-and-Water and International Rates

The order also referred to the fact that the application seeks authority to increase all rail-and-water rates, as well as all-rail rates, and to the uncertainty left by the application as to whether it is proposed to increase any international rates. Therefore the petitioners were ordered to state within 15 days whether the application as filed by them is intended to apply to any international rates, and whether it is tendered on behalf of or with the concurrence of the foreign rail lines, and also whether it is tendered with the concurrence of the water lines and carriers participating in rail-and-water rates.

In the petition the railroads had said that "in emergencies of this character previous experience has shown that there is but one method which has ever been adopted either by the carriers or the commission to af-



ford the necessary relief. That is a percentage method. No other method is available now if relief is to be secured in time to meet the situation. Relief cannot be secured in time to meet the emergency by proposals for adjustments of freight rates which seek to determine the effect of competition of other forms of freight transportation. All freight traffic should be subjected uniformly to such increase with certain adjustments which do not affect the principle involved." These "adjustments" refer to the practice followed as to such commodities as coal and coke in former proceedings in increasing or decreasing rates to select a basing rate group, to increase or decrease the rates applying from that group a certain percentage and apply the amount thus ascertained in cents per hundred pounds or per ton to the existing rate for each group within the competitive zone.

#### Possibility of Increased Truck Competition

They had also indicated a realization that an increase in rates might tend to increase truck competition but they had said it was impossible to make a reliable estimate of the extent to which any given increase in railway freight rates would further divert traffic from the railroads to this form of transportation. Undoubtedly the railroads were seeking to emphasize that if the government is going to encourage trucks and barges to take an increasing amount of the railway traffic the traffic that remains is liable to have to pay more than it otherwise would for service. They also may have had in mind that if the railroads increase their rates the truck lines and the barge lines, many of which have been operating on an unprofitable basis, may take advantage of the opportunity to increase their rates too, so that the competition might still be conducted on a higher level.

On June 20 Chairman Brainerd and Commissioners Eastman and Porter held a two-hour conference with the committee of the National Association of Railway and Utilities Commissioners on co-operation with the federal commission, at which the committee decided to recommend the appointment of a committee of state commissioners to co-operate with the Interstate Commerce Commission and to sit with it during the hearings. The railroad application had suggested that the co-operation of the state commissions be invited, as provided by law, as it was the intention of the roads to ask authority to increase intrastate rates also by 15 per cent.

The commission has already accumulated a considerable file of informal protests against any increase in freight rates, mostly letters or telegrams from individuals, many of which were addressed to President Hoover and referred to the commission, but including some from associations of shippers. Some of the letters said that wages ought to be reduced instead of increasing rates. There were also some letters favoring an increase. Senator Brookhart, of Iowa, sent a 500-word telegram—at government expense—asking that the "demand of the railroads be suspended until an investigation can be had and that upon a full hearing the valuations of the railroads be reduced to correspond with present conditions and that the rate of return be reduced below 4 per cent." The Kansas Public Service Commission sent a telegram saying that the "economic condition of agriculture is more serious than that of the railroads" and that "no emergency as to the railroads should be accepted as reason for denying agricultural interests the fullest opportunity to be heard." The North Dakota commission has also protested.

## Railway Purchases Remain Dormant

**C**LASS I railways of the United States expended approximately \$70,000,000 in the markets of the country for materials and supplies during April, 1931, according to preliminary estimates made by the *Railway Age* from special reports received from railroads with approximately 40 per cent of the railway mileage. This expenditure includes approximately \$22,200,000 for fuel, \$6,300,000 for rail and \$41,500,000 for storehouse stocks, forest products and other supplies. Corresponding purchases for the previous months of 1931, according to the estimates, were 26.5 million dollars for fuel in January, 22.5 million dollars for fuel in February and 22.8 million for fuel in March; 10.3 million dollars for rail in January, 5.3 million in February, 4.6 million in March; 49.5 million dollars for miscellaneous supplies in January, 41.5 million in February and 44.0 million in March; while total purchases were \$89,000,000 in January, \$68,000,000 in February, and \$71,000,000 in March.

Subject to revision with more complete returns, the direct purchases made by the railways amounted to approximately \$298,000,000 for the first four months of 1931. This includes approximately \$94,000,000 for fuel, \$26,500,000 for rail and \$176,500,000 for miscellaneous supplies. The fuel purchases represent a reduction of approximately 32.5 million dollars, or 25.8 per cent from the corresponding purchases for the first four months of 1929, and a reduction of 22.5 million or 19 per cent from the estimate for the first four months of 1930. Rail purchases were approximately 14.5 million, or 35 per cent, below the corresponding purchases in 1929; and 5.0 million, or 15.8 per cent below the same period in 1930; and miscellaneous purchases were 111.5 million, or 38.8 per cent, below the first four months of 1929, and 94.5 million, or 35 per cent, below the corresponding purchases in 1930; while total direct purchases for the first four months of 1931 were 157.0 million, or 34 per cent, below those for 1929, and 121 million, or 29 per cent, below those for 1930.

Estimates for purchases during May, 1931, await more complete reports. Five roads for which figures are available, however, expended \$2,832,428 for supplies in May, compared with \$3,034,986 in April, and \$3,475,926 in March.

Railway inventories showed little change from the inventories at the close of 1930, according to the statistics from 17 roads whose supplies on hand at the end of April amounted to \$147,273,336, compared with \$146,659,078, an increase of \$614,258, or 0.4 per cent. Fuel on hand dropped from \$14,655,844, at the close of 1930, to \$13,945,441, or 5 per cent, on these roads; rail increased from \$13,331,736 to \$14,802,572, or 10 per cent; tie stocks from \$27,113,961 to \$33,671,725, or 24 per cent; while miscellaneous materials increased from \$82,728,982 to \$84,853,579, or 2.5 per cent.

THE WOMEN'S AID of the New York division of the Pennsylvania has recently concluded a membership campaign which has resulted in the enrollment of 30,975 members, equal to 222.8 per cent of the number of employees of the road on that division. That is to say, employees have taken out numerous memberships in the names of not only their wives, but also of daughters and other female relatives.

## Rate Increase Plea Well Supported

**C**LOSELY following the recent presentation to the Interstate Commerce Commission of a petition for a general increase of 15 per cent in railroad freight rates, several influential groups of security holders and business men have announced themselves as being in sympathy with the railroads' action, and as being ready to give it their active support. Savings banks and life insurance companies have already formed a committee "to assist in the betterment of railroad conditions" and "to present the viewpoint of these institutions as to the need for additional railroad revenues to the Interstate Commerce Commission"; the Cleveland Chamber of Commerce has gone on record as favoring the proposal, and the Merchants' Association of New York has endorsed the principle of a "reasonable advance in freight rates."

### Banks and Insurance Companies to Aid Roads

A meeting of representatives of life insurance companies and mutual savings banks from various parts of the country, to discuss the emergency conditions confronting the railroads, was held in New York on Monday, June 22, at which it was determined to organize an "Emergency Committee on Railroad Investments of Life Insurance Companies and Savings Banks" to aid in the improvement of the railroad situation and "thereby to conserve the railroad security investments of these fiduciary institutions." The viewpoint of these companies as to the necessity for an increase in railroad revenues will be presented to the Interstate Commerce Commission through a petition which is to be filed at an early date, according to a statement issued by the committee.

Edward D. Duffield, president, Prudential Life Insurance Company of Newark, N. J., was elected chairman of the emergency committee, while Philip A. Benson, treasurer, Dime Savings Bank of Brooklyn, N. Y., was chosen as treasurer, and Henry Bruere, president, Bowery Savings Bank of New York, as secretary. Life insurance companies actively represented at Monday's meeting were the Massachusetts Mutual, Prudential of Newark, Metropolitan of New York, Aetna of Hartford, Conn., State Mutual of Worcester, Mass., Mutual of New York, New England Mutual and New York Life.

Savings banks whose representatives were present included the Union Dime Savings of New York, the Emigrant Industrial of New York, the New Bedford (Mass.) Institute of Savings, the Worcester Five-Cent Savings, the Howard Savings Institution of Newark, the Bowery Savings of New York, the Dime Savings of Brooklyn, and the Lynn (Mass.) Institute for Savings. Some of the individuals present, however, were authorized to speak for more than one institution or group of institutions, while many banks and insurance companies which were unable to send representatives have assured the committee of their active support and co-operation, in their response to a letter sent out by Mr. Bruere during the week of June 15, which letter read in part as follows:

It is proposed to take such steps as may be deemed necessary to preserve and insure the credit of the carriers of the country in the present emergency. Such steps may include participation by the committee to the extent deemed necessary, in proceedings before the Interstate Commerce Commission, for the purpose of presenting to the commission the viewpoint of the in-

vesting institutions of the country as to the need for increased railroad revenues.

Those best informed on the requirements of the present situation believe that such a presentation would be helpful and effective toward securing the necessary emergency relief.

It is believed essential for the complete effectiveness of this movement that every life insurance company and savings bank owning railroad securities join the committee.

As inferred in this letter, all life insurance companies and mutual savings banks throughout the country will be invited to associate themselves with the committee, and responses to date indicate that the majority will do so.

It is estimated that railroad bonds held by all such fiduciary institutions total approximately \$4,500,000,000, and it is understood that the committee is already authorized to represent companies owning from 50 to 75 per cent of this aggregate.

### Cleveland Chamber of Commerce Supports Increase

Active backing for the railroad's proposal for a general freight rate increase has also been ordered by the board of directors of the Cleveland Chamber of Commerce, this action resulting from studies made by the chamber's Shippers and Transportation committees and by the board itself. In summarizing the findings of the committees and the board, Randolph Eide, president of the chamber, said:

It is generally admitted that an emergency exists in railroad transportation. Net earnings so far this year have barely exceeded two per cent on property investment, a rate of earnings which, in many instances, will not pay bond interest. It does not even approach the reasonable return intended by Congress when the Transportation act of 1920 was passed, and set at 5¾ per cent by the Interstate Commerce Commission. It is recognized that railroad net earnings must be increased either through increased receipts or decreased expenses.

Railroad employment, whether of capital or labor, is a public service. As such, it differs from other employment in important particulars. Wages to railroad labor and the return on railroad investment are relatively low, the latter being limited by statute and common law to no more than a reasonable return on the property devoted to the public use. In the 41 years during which reports have been made to the commission, return on railroad investment has never reached the level held to be reasonable. Under such circumstances, it is only equitable that there should be a greater security of employment of both labor and capital than is the case in private industry. Where the maximum is limited, the minimum should likewise be limited.

Regardless of the equities of the situation, the railroad emergency demands emergency treatment on both financial and industrial grounds. The stability of many insurance companies, savings banks and trust funds is bound up with that of the railroad securities which they now hold as investments, subject to the requirements of state laws. A long continuance of the present low level of earnings will remove a large amount of carrier securities from the list of legal investments, force sales and still further depress railroad credit.

From the industrial point of view, the drastic economies forced upon the railroads by the recession in business have had both indirect and direct effects. While wage rates have been maintained almost without exception, payroll expenses have been sharply reduced by lay-offs and part time employment, with a resulting sharp reduction in the purchasing power of nearly a million and a half employees. Railroad purchases for additions and betterments have been reduced until the aggregate budget for 1931 is only 25 per cent of the average expenditure for the five preceding years. Maintenance of way, structures and rolling stock have been reduced to a minimum. As the railroads' total purchases are estimated to be one-sixth of the country's total, the effect upon industry by such curtailments is obvious.

The Cleveland Chamber of Commerce believes that the remedy to be applied to the situation is a general freight rate increase and it has decided to support the rail lines in their efforts to secure such an increase. Further railroad economies are either of too small moment to be even palliative, or, if sufficiently drastic, would continue the vicious circle of reduction in buying power and demand and destroy the high quality of railroad service which has been developed by slow degrees since the chaotic conditions of 1919-1921. We hope to avoid



the really disastrous losses forced upon industry by the constant delays, car shortages and congestion of those years.

Purchases are held pending stabilization of prices, and with the coming of stabilization an upturn begins almost immediately. In many instances the present decline has carried prices below the cost of production and no force has as yet appeared to stop that trend. Transportation, viewed as a commodity, is the only one universally used in connection with which the producers may set their prices in unison, without violation of law. It offers the one obvious point at which the present economic tendency may be halted and turned upward.

The chamber's committees and its board of directors are convinced that an increase in railroad gross revenue is the most constructive economic step which can be taken at the present time. It will work fairness to those in railroad service, tend toward financial stability, and give an upward stimulus to business generally.

#### Merchants' Association Approves Principle

Similarly, in line with the favorable action taken by these other groups, the Merchants' Association of New York announced on June 21 that, by unanimous action of its board of directors, taken after a careful study of the whole subject by its Committee on Transportation, it had approved the principle of a "reasonable advance in freight rates."

This action was taken because, in the judgment of the directors and the transportation committee, "such an increase at this time would not only safeguard railroad securities but would also increase the purchasing power of the railroads and would thereby tend to increase manufacturing and employment." In giving its endorsement to the principle of increased freight rates, however, the association reserved the right to protest against any method of increase which would tend to upset the competitive relationship of New York and competing communities and which might, therefore, adversely affect the "trade and welfare of New York."

\* \* \*

# LET'S Get Our Boys Back on the JOB

More New Business  
Will DO It



Poster Urging Missouri Pacific Employees to Create More Employment by Solicitation of New Business

## Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended June 13 amounted to only 732,453 cars, a decrease of 28,437 cars as compared with the week before. This was also a reduction of 193,613 cars or over 20 per cent as compared with the corresponding week of last year and of 337,217 cars, or 31 per cent, as compared with 1929. Loading of grain, forest products, ore, merchandise and miscellaneous freight showed considerable reductions as compared with the preceding week. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

#### Revenue Freight Car Loading

Week Ended Saturday, June 13, 1931

Districts	1931	1930	1929
Eastern .....	166,048	208,076	248,164
Allegheny .....	142,109	191,002	224,677
Pocahontas .....	44,948	52,151	60,660
Southern .....	110,410	125,073	143,178
Northwestern .....	101,548	149,137	171,555
Central Western .....	106,106	128,335	142,133
Southwestern .....	61,284	72,292	79,303
Total Western Districts .....	268,938	349,764	392,991
Total All Roads .....	732,453	926,066	1,069,670
Commodities			
Grain and Grain Products .....	30,967	38,975	42,175
Live Stock .....	18,072	20,627	23,525
Coal .....	106,403	135,118	154,656
Coke .....	5,462	9,382	12,466
Forest Products .....	30,606	50,070	70,832
Ore .....	27,614	62,433	74,381
Merchandise L.C.L. ....	218,710	243,045	261,619
Miscellaneous .....	294,619	366,416	430,016
June 13 .....	732,453	926,066	1,069,670
June 6 .....	760,890	935,582	1,055,768
May 30 .....	710,934	860,064	972,825
May 23 .....	755,071	929,606	1,062,088
May 16 .....	747,732	928,759	1,046,594
Cumulative total, 24 weeks .....	17,481,578	21,343,241	23,450,510

The freight car surplus for the period ended June 8 averaged 613,815 cars, a decrease of 2,109 cars as compared with the last week in May. This included 311,285 box cars, 230,960 coal cars, 32,036 stock cars, and 16,050 refrigerator cars.

#### Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended June 13 totaled 52,161 cars, an increase over the previous week of 2,204 cars but a decrease of 12,501 cars from the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
June 13, 1931 .....	52,161	23,683
June 6, 1931 .....	49,957	23,751
May 30, 1931 .....	46,877	26,066
June 14, 1930 .....	64,662	31,483
Cumulative Totals for Canada		
June 13, 1931 .....	1,155,418	672,969
June 14, 1930 .....	1,404,052	860,007
June 15, 1929 .....	1,557,120	1,027,894

CASUALTIES IN HIGHWAY CROSSING ACCIDENTS on the Pennsylvania in 1930 totaled 32 per cent fewer in number than in the preceding year; evidence tending strongly to support the statement that the company is exerting every effort to reduce the results of reckless and heedless driving which the railroads have to deal with all over the country. The records of the Pennsylvania show also that one-half of the accidents at highway crossings on that road in 1930 occurred when the trains were either standing still or moving at less than 25 miles an hour. And in the first three months of the present year, 42 per cent of all the crossing accidents on the Pennsylvania were the result of motor vehicles actually running into the sides of trains.



O. S. Jackson,  
Vice-Chairman and Chairman-Elect



A. R. Ayers,  
Chairman



S. Zwright,  
Vice-Chairman-Elect

## Mechanical Division Holds Twelfth Annual Meeting in Chicago

Two-day session featured by 18 committee reports—Principal addresses by R. H. Aishton and M. J. Gormley

IN accordance with the program announced several months ago, the twelfth annual meeting of the American Railway Association, Mechanical Division, was held at the Congress Hotel, Chicago, June 23 and 24, all entertainment and exhibition features being eliminated and the meeting confined strictly to a two-day business session. Following the opening exercises, Chairman A. R. Ayers, general manager, New York, Chicago & St. Louis, made a brief address and called for the report of the General Committee, which was read by Secretary V. R. Hawthorne. This report outlined the principal activities of the Mechanical Division during the past year and, among other items of special interest, stressed the important test work conducted under the auspices of the division, as follows: Road tests of power brakes, a report of which is now under preparation; coupler tests, as a result of which a swivel-butt coupler and yoke design are suggested for adoption as alternate standard with the Type-E coupler; draft-gear tests, resulting in the recommendation that the specifications for approved draft gears submitted last year be adopted as standard except as regards the recoil feature which is subject to further study; laboratory tests of automatic hose connectors made at Purdue university under the direction of H. A. Johnson, director of research, American Railway Association.

Chairman Ayers introduced the first speaker at the opening session, R. H. Aishton, president of the American Railway Association, who was followed by M. J.

Gormley, executive vice-president. An abstract of the addresses and committee reports presented during the two-day session of the division are included in the following.

### Address by Mr. Aishton

After welcoming the members to the convention, R. H. Aishton, president of the American Railway Association, stated that, individually and collectively, they are now faced with difficult problems, but almost every other industry and class of men is now confronted with similar problems which are no more serious than have been met and overcome in the past. The keynote of Mr. Aishton's brief remarks was an appeal for railroad men to be receptive to new ideas and willing to violate all precedents, if necessary, in helping fit the railroads to meet new conditions successfully.

Mr. Aishton quoted at length from newspaper clippings which openly charged American railways with negligence in failing to develop light-weight equipment with operating speeds up to 150 m.p.h. as are reported obtainable with the Zeppelin air-propelled rail car recently developed in Germany. These clippings maintain that if American railroad engineers have not sufficient initiative to carry developments of this kind to a successful conclusion, they ought to call in European engineers to show them how. Mr. Aishton said that, while he does not necessarily advocate the type of equipment referred to, and practical railroad men in this country consider operating speeds of 150 m.p.h. "the stuff that dreams are made of," he does advocate that railroad men keep their eyes open to new developments which are going on everywhere about them. Past experience has shown that practically every vital improvement in railroad practice and operation in the past has been looked upon with skepticism and distrust at first.



Mr. Aishton paid a high tribute to the work of the Mechanical Division, as well as to the mechanical departments of the railroads in general, and said that they must bear the brunt of developments of those devices and methods which will enable the railroads to keep in the forefront of progress and meet new conditions as they arise. Quoting the familiar expression, "The horse makes the wagon go," he said that adequate motive power is essential in order that the railroads may continue to carry the transportation burden of the country.

Mr. Aishton closed his remarks with the statement that the board of directors of the American Railway Association is keenly desirous of helping the Mechanical Division in its vitally-important task of improving mechanical-department conditions.

## Mr. Gormley's Address

The railroads, due to greatly-increased efficiency in operation, can continue to meet, without difficulty, for some time to come, but with fewer freight cars than they now own, the transportation requirements of this country based on any reasonable peak of traffic that might be expected, M. J. Gormley, executive vice-president, American Railway Association, told the members of the Mechanical Division.

"The railroads in 1923," said Mr. Gormley, in addressing the opening session, "adopted a program for the rehabilitation of the transportation machine after the war. Since the beginning of that year, the railroads have spent more than six and three-quarter billions of dollars for improvements in furtherance of that program.

"Since 1923, the railways have placed in service approximately 890,000 new cars and 15,000 new locomotives, but have retired so many that we now own 116,000 fewer cars, not including refrigerators, than at the high point of ownership in 1925, and have 9,000 fewer locomotives. This new and improved equipment, with more powerful locomotives and increased capacity of cars, has brought about an increase in efficiency in movement of cars in the past eight years of 26 per cent, based on the miles per car per day, not including surplus equipment. There has also been an increase of 26.6 per cent in the miles per train-hour during the same period.

"As a result of this efficiency and economy, the unit cost of railway operation has been decreasing annually. If the unit cost of operation had been the same in 1929 as it was in 1923, the total operating expenses of the carriers would have been greater than they were by \$519,000,000. This would have meant a reduction of 41.5 per cent in the net income actually earned in 1929.

"We do not, however, get the full advantage of this increase in efficiency in movement unless it is paralleled with a reduction in the amount of capital invested in equipment.

"In view of the greatly-increased efficiency of movement, and based on any reasonable peak of traffic that might be expected, we now estimate that the traffic of the country for some time to come can be handled with a further decrease in freight cars, not including refrigerators, of 134,000, which would mean a total reduction of 250,000 under the ownership at its high point in 1925. This is a conservative estimate, and is not based on the depressed situation of today or of last year.

"In bringing about any reduction in car ownership, it should always be kept in mind that it can be accomplished successfully only by continuing the policy of replacement of the less efficient cars by a lesser number of modern cars and by a standard of maintenance that will reduce delays to loaded cars en route."

In discussing standards of maintenance, Mr. Gormley mentioned the considerable number of cars now going to repair tracks because of defective brake rigging, trucks, draft gears, arch bars, etc., and suggested that these parts receive proper attention wherever cars are on the repair tracks for periodic air-brake attention or heavy repairs. General maintenance conditions will thereby be greatly improved and delays to cars and lading correspondingly reduced.

After outlining present conditions with regard to the ownership of automobile equipment, Mr. Gormley said that future purchases of this equipment should generally be made by railroads directly serving the automobile-producing territory, a practice which will greatly decrease the total number of automobile cars required. This same condition applies with respect to other special equipment, such as cars for handling automobile bodies, automobile engines, gondola cars for handling long steel shapes, pipes, etc.

With regard to privately-owned freight cars, Mr. Gormley said: "There are a great many privately-owned freight cars in service today, due to the failure of the railroads in years gone by, for financial reasons or otherwise, to furnish all equipment needed for the movement of certain special types of

traffic. With the exception of the brine-tank refrigerator cars, tank cars and a small number of other special-type cars, the railroads are today, through their ownership or through railroad-controlled private refrigerator lines, in position to furnish all equipment needed for the movement of the traffic of the country. There certainly can be no justification today for the extension of the ownership of private freight cars beyond what now exists. This is particularly applicable to stock and refrigerator cars."

Mr. Gormley commended the Mechanical Division for its work in connection with the standardization of materials and equipment in past years, more progress along this line having been made by the railroads than by almost any other industry. He closed his address with the following comments regarding standardization and railway efficiency.

"Nothing, of course, should be done that will interfere with individual initiative, and likewise the work should not be carried to the point where it could be called strangulation instead of standardization. But, on the other hand, the railroads are under the definite obligation to furnish transportation service in the most economical manner possible. The public generally should always keep in mind that the major part of the increase in efficiency since 1923 in the movement of traffic and economy in operation is the direct result of the large expenditures for improved cars, locomotives and other facilities, plus a better shipper co-operation in the handling of equipment through the regional shippers' advisory boards. The ability of the railroads to bring about further economies in the future depends largely upon their credit for financing continued improvements."

## Address of Chairman Ayers

During the past year several important matters which will come before you in the committee reports have been worked out in cooperation with manufacturers, shippers, private-car owners, equipment builders, other divisions of the American Railway Association and federal authorities. This cooperation is an important factor in the work of the division and is highly appreciated by us. Some of these groups have been active over a period of years and it would have been difficult, if not impossible, to make as much progress as we have without their assistance.

Progress is being made in the development of special materials and the treatment of materials to meet special requirements of service. The railroads should give fullest consideration to these developments where they will prolong the life of the equipment between shoppings and reduce cost of maintenance. Therein, I think, lies one of our greatest opportunities for improvement.

The outstanding problem which confronts us today is, of course, to meet the prevailing condition of business. At no time within my recollection has the work of this division and other railroad-mechanical organizations stood out to better advantage than it does today, assisting the railroads not only to improve the speed and reliability of service, but at the same time to spend a continually diminishing proportion of gross revenue for maintaining and operating cars and locomotives. I desire to give full credit to those who have been helpful in assisting to carry on this work. The necessity as well as the opportunity for further improvement is growing rapidly larger rather than smaller and we must make even more progress in the future than we have in the past.

## Report on Safety Appliances

The report on safety appliances signed by H. A. Johnson, Director of Research in Charge of the Power Brake Investigation, reviewed briefly the road tests which were started August 1, 1929. All of these tests with the standard K brake equipment, Westinghouse FC-5 and FC-3 equipment have been completed and the records are now being analyzed at Purdue University. A report of the road tests is now in the process of preparation.

**James Triple Valves Tested**—Rack tests on the James triple valves were started February 10, and completed February 18, 1931. Twenty-five James valves were installed on the test rack with 75 standard K triple valves. All tests with the James equipment were 100-car tests and the James equipment was

either the first 25 or the last 25 cars on the rack. The schedule of tests consisted of 23 tests including service applications, emergency applications, releases after both service and emergency applications, cycling and graduated-release tests. The rack tests on this equipment developed the following undesirable features:

There were failures of the James valves to apply with both the 10-lb. and 25-lb. service reductions. The James valves which did apply developed 21 per cent less brake force with a 10-lb. service reduction and 3.7 per cent less brake force with a 25-lb. service reduction than the standard K equipments.

Forty-two per cent of the James valves failed to release following a 10-lb. service reduction when the James valves were on the rear end compared to no failures to release with standard K equipments. To release these James valves it was necessary to bleed the auxiliary reservoirs.

The substitution of 25 James valves for 25 standard K equipments on the head end of the 100-car test rack delayed 50.8 per cent the service application of Car 100. The time of application of the other equipments on the test rack were delayed proportionately.

The time of Car 100 to apply in emergency application was lengthened 26.7 per cent when 25 James valves were substituted for 25 standard K equipments. Experience gained from the road tests on the Pacific Coast has shown that lengthening the propagation time increases the severity of slack action and shocks.

There were 8 cases of undesired emergency applications during the running of the 23 tests on the James triple valves.

With regard to grade operation, the brake cylinder pressure developed by the James valve during a cycling operation cannot be controlled when the 25 James valves were located on the rear end of the 100-car test rack. The graduated release feature of the James valves consisted of holding the brakes applied until the brakes were partially recharged and then releasing at the same rate as in direct release position. During the graduated release tests on the test rack, 4.9 per cent of the James valves failed to apply and 17.1 per cent of these valves failed to release.

In view of the results of the tests on the James triple valve, it is recommended that this equipment be given no further consideration in this investigation.

**Discussion.**—In connection with the report on the power brake tests, C. E. Chambers, chairman of the Committee on Safety Appliances made the following statement:

"All of the air brake equipments used in the road tests (except the standard Type K) were made up in experimental form so that various functions could be used or eliminated or different combinations of these functions could be easily set up. None of these equipments were reduced to a commercial form as no one knows what functions will finally be decided upon. Just before the A.R.A. undertook this investigation, the Interstate Commerce Commission issued its 'tentative specifications and requirements for power brakes and appliances for operating power brake systems,' which set forth the functions of a power brake which, in the opinion of the Commission, were necessary. After the results of the road tests have been thoroughly analyzed and the report completed, it will probably be necessary for representatives of the A.R.A. and the Commission to meet together to decide upon the functions of the brake which will be agreeable to both parties. If it is finally decided that the present standard brake must be changed, and an agreement on the new functions of the brake has been reached, then any air-brake manufacturer will be at liberty to develop in commercial form the devices necessary to meet the requirements."

## Report on Locomotive Design and Construction

The report of the Committee on Locomotive Design and Construction included a recommendation, which was signed by S. S. Riegel for the sub-committee, that the method of counterbalancing locomotives as described in the report submitted last year be adopted as recommended practice.

A sub-committee, of which J. C. Hassett served as chairman, recommended that for mounting, driving and trailing axles and crank pins in cast-iron centers, the desired pressure be based on 10 tons per inch of diameter, with an allowable variation of 10 per cent over or under; for cast-steel centers 15 tons per inch of diameter with an allowable variation of 10 per cent. No change was recommended in the present standard practice for mounting car and tender axles. It was recommended that a mixture of 12½ lb. of white lead to one gallon of boiled linseed oil be used as a lubricant.

A sub-committee, consisting of H. H. Lanning (chairman), S. Zwright, H. M. Warden, George McCormick, J. C. Hassett and E. C. Anderson, recommended that Fig. 2, page 7, Section F, of the Manual, showing contour of engine truck, driver and trailer wheels, be revised to call for 1-in., instead of 1½-in., height of flange. This sub-committee also recommended further study to develop a single flange and tread contour that will be suitable for adoption for all wrought-steel and steel-tired wheels for both cars and locomotives.

The same sub-committee recommended, as the result of a study of eccentric cranks on locomotives, a design of crank for optional use and also recommended that crank arms be made preferably of forged medium steel in accordance with the A.R.A. standard material specification for axles, shafts and other forgings. The designs shown in the report are also satisfactory for electric cast steel.

**Unification of Screw Threads.**—A sub-committee, consisting of A. H. Fethers (chairman), S. Zwright and L. A. Richardson, presented a report showing the results of studies made to secure the unification of screw thread standards. These studies were confined to screw threads for bolts, machine screws, nuts and tapped holes. It is expected that the future scope of these studies will include screw-thread standards for all special diameters, pitches, and lengths of engagement, screw threads for pipe, hose couplings, and other threads such as are now included in the activities of the National Screw Thread Commission, sponsored by the American Standards Association.

**Standardization of 300-Lb. Screwed Pipe Fittings for Steam Locomotives.**—A sub-committee report, signed by R. M. Brown (chairman), W. I. Cantley, S. S. Riegel, J. C. Hassett and G. H. Emerson, recommended that the designs for 300-lb. screwed pipe fittings prepared by the Manufacturers' Standardization Society of the Valve and Fittings Industry and the American Standards Association be submitted for adoption by letter ballot and that the Committee on Specifications and Tests of Materials be requested to prepare specifications covering material, tests and manufacture of these fittings.

This sub-committee also reported on the standardization of globe and angle valves for 300-lb. pressure for use on steam locomotives. Owing to the large amount of work involved in attempting to prepare designs for numerous sizes of valves, the sub-committee was able to report progress on only a 1¼-in. straight globe valve.

**Design of and Repairs to Locomotive Springs.**—This sub-committee, composed of G. H. Emerson (chairman), H. A. Hoke and W. G. Black, pointed out in its report that the system of manufacture recommended in its previous report applied only to carbon-steel spring plates and carbon-steel springs. Plates and springs manufactured by this process will stand test in which the set has been completely absorbed and reversed below the horizontal plane in deflection without failures after repeated application. In the case of double-elliptic springs, the bands can be brought together and released repeatedly without failure. Springs which develop failures have generally shown on investigation that some defect existed in the steel or surface of the plate. A further source of failure discovered was due to mixing the steel in the assembly of the spring plates, such as alloy steel plates with carbon steel. It was discovered that these alloy steel plates can be readily detected when plates are in the heating furnace, showing a darker color than the carbon steel plates when removed.

The report was signed by W. I. Cantley (chairman), mechanical engineer, L. V.; H. H. Lanning (vice chairman), mechanical engineer, A. T. & S. F.; H. A. Hoke, assistant mechanical engineer, Penna.; G. McCormick, general superintendent motive power, S. P.; J. C. Hassett, mechanical engineer, N. Y., N. H. & H.; E. C. Anderson, mechanical engineer, C. B. & O.; W. G. Black, mechanical assistant to the president, C. & O.; C. E. Brooks, chief of motive power, C. N. R.; G. H. Emerson, chief of motive power and equipment, B. & O.; A. H. Fethers, general mechanical superintendent, N. P.; R. M. Brown, superintendent motive power, M-K-T; S. S. Riegel, mechanical engineer, D., L. & W., and L. A. Richardson, general superintendent motive power, C. R. I. & P.

**Discussion.**—The discussion indicated approval of the recommendations of the committee for some reduction in the pressure of wheel fits. It was stated that many roads have had trouble with cracked wheels, largely due to the effect of expansion of the axles from hot journals. Such discussion as bore on the question of flange and tread contours supported the committee in its recommendation that a single flange and tread contour be developed for both car and locomotive wheels. In the matter of securing crank arms to main crank pins, the question was raised as to why the committee submitted two recommended designs rather than a single design and why keys were not depended upon to take the shear rather than the two types of bolts recommended by the committee.

Differences in water conditions, resulting in varying valve



lubrication difficulties, were said by the committee to justify the submission of the two designs. The difficulty of producing sufficiently-tight fits on the keys when the crank arm is applied over the key was given as the reason for not depending upon the key to retain the crank arm in its correct position on the pin. When keys are applied after the crank arm is in place, they frequently work out and cause failures of the eccentric rods.

In presenting its proposed design for 300-lb. globe and angle valves, the committee asked for instructions as to the desirability of proceeding with the development of complete standard designs. A motion was carried instructing the committee to proceed with such designs and it was suggested that the yoke-type of valve be considered for use with high-pressure superheated steam, in addition to the bonnet-type shown by the committee. The entire report of the committee was submitted to letter ballot.

## Storage-Battery Capacity Rating

A method for rating the capacity of lead and nickel-iron storage batteries was presented and recommended by the Committee on Locomotive and Car Lighting. Rate of charge, voltage limits, temperature, specific gravity and name plate data are specified. The report is identical in substance with that prepared by the Association of Railway Electrical Engineers and published in its proceedings, in its Manual of Recommended Practices and also in the October, 1930, issue of the Railway Electrical Engineer.

The committee consisted of W. E. Dunham (chairman) superintendent car department, C. & N. W.; E. P. Chase, assistant engineer, Penna.; H. A. Currie, electrical engineer, N. Y. C.; E. Wanamaker, electrical engineer, C. R. I. & P.; A. E. Voigt, engineer car lighting, A. T. & S. F.; F. O. Marshall, electrical engineer, Pullman Company; P. J. Callahan, supervisor car and locomotive electric lighting, B. & M.

*Action.*—The report was accepted and submitted to letter ballot.

## Report on Car Construction

The report submitted by the Committee on Car Construction covered a variety of subjects and included the reports of several sub-committees dealing with specific subjects.

### Designs of Recommended-Practice Cars

*Single-Sheathed Box Cars*—Inasmuch as no change in clearance outline has been made since the last convention, no changes were made in this design.

*Double-Sheathed Composite Box Cars*—Last year's report stated that the demand was for a single-sheathed composite car or a double-sheathed steel car and that consideration would be given to the omission of the double-sheathed composite car from the Supplement to the Manual. The sub-committee made this recommendation in the event that an increased clearance outline is adopted and box-car designs are increased in size.

*Steel Double-Sheathed Box Cars*—The question of clearance outline is still unsettled; therefore the sub-committee has not gone ahead with the design.

*Composite Automobile Cars*—The question of clearance outline is still unsettled and the sub-committee has not made any progress on the design. Recommendations were made for a single-sheathed composite automobile car with 12-ft. clear door openings, staggered, one design 40 ft. 6 in. inside length and the other 50 ft. 6 in. inside length, both 50 tons capacity.

*Self-Clearing Hopper Cars*—All drawings for 50- and 70-ton hopper cars have been completed, including the alternate design of narrow-end construction. The Wine Railway Appliance Company, Toledo, Ohio, the holder of certain patents which affect the narrow-end construction for hopper cars, has made a waiver of patent rights to railroads or car-owning companies which are members of the American Railway Association.

*Fundamentals of Car Design*—No changes involving the basic method of calculation were made during the year. Investigation by individual roads of the weight-reducing possibilities of alloy steels is suggested. The use of such alloy steels in new cars initiates the suggestion that some provision should be made to avoid the subsequent substitution of lower-strength materials when repairs are made.

*Equipment Clearances and Maximum Outline of Proposed Recommended-Practice Cars*—A questionnaire has been sent

out to all roads requesting information that would enable representatives of the Mechanical, Engineering, Transportation and Traffic Divisions of the A.R.A. to select a satisfactory limiting outline for a car having 9 ft. 2 in. inside width, 10 ft. inside height and 50 ft. 6 in. inside length. Questions have arisen as to the information necessary and a re-check of the entire matter is required. As soon as the satisfactory limiting outline is decided upon, the work of completing the various car designs will be carried forward.

*Center-Plate Height*—In view of the recent developments in the design of car parts and the possibility of the use of trucks having normal capacities in excess of those now in use, no reduction is advisable in the present standard truck center-plate height of 26¾ in. Therefore, the sub-committee reports the dimension will be maintained.

### Letter-Ballot and General Items

It is recommended that the following items be submitted to letter ballot:

*Truck Bolsters, Design-Test Requirements*—Because no form of built-up bolster has been submitted which will meet requirements, it is recommended that the note shown on the title page of the specifications as printed in section A of the Manual exempting built-up bolsters from specifications be omitted, effective March 1, 1932.

*Stake Pockets for Flat Cars*—Since the adoption of stake pockets for recommended practice in 1928, shown on page 28-A, section C of the Manual, the committee has been instructed to revise the drawing to show rounded corners to prevent cutting wires, cables and other fastenings. It was also felt that pockets should be redesigned for greater strength and that the cast pocket secured with U-bolts should be eliminated.

The committee has accordingly prepared a design increasing the depth of outside wall and another design, with pressed ribs, decreasing the thickness of material from ½ in. to ¾ in. minimum and specifying round-edge material.

*Elimination of Pressed-Steel Journal Boxes*—Recommendation is made that Interchange Rule 3 be amended to prohibit the application to new cars after January, 1933, and that existing cars so equipped cannot be accepted from the owner after January, 1938.

*Journal Box and Pedestal*—In accordance with instructions received, the sub-committee has redesigned the journal box for the 5-in. by 9-in. journal, as shown between pages 22 and 23, Section D, in the Manual, so that it may be used with the flat-face pedestal and can be manufactured with or without a liner. The sub-committee has also designed a flat-face pedestal for the 5-in. by 9-in. and 5½-in. by 10-in. journal boxes.

*Design of Journal Wedges*—Recommendation is made that the note on page 25, section D, of the Manual, be revised to read "Wedge shall be of forged or cast steel," thereby eliminating the malleable-iron wedge.

*Limits for Coupler Heights on Passenger Cars*—The sub-committee recommends that the following be referred to letter ballot for adoption as standard: "For passenger-carrying cars:—Nominal height 34½ in.; maximum height 35 in.; minimum height 33 in."

"Load-carrying passenger equipment cars shall meet I.C.C. and A.R.A. requirements for coupler height, as prescribed for freight cars."

*Definitions and Designating Letters for Freight Cars*—Attention has been called to the fact that the symbol "RP"—Iceless Refrigerator—is incomplete in that it covers only cars where protection is provided against heat, whereas a number of cars of this type have been constructed which provide protection against both heat and cold.

In view of the above it is recommended that the definition for "RP" car as now shown in section L of the Manual be changed to read in accordance with the following form: "RP—Iceless Refrigerator. A house car equipped with insulation, with or without means of ventilation, and provided with apparatus or other device for furnishing protection against heat and/or cold."

*Brine Valves and Operating Rigging, Rules for*—In order to allow greater latitude in the design and construction of brine tanks and their accessories and to be in conformity with present-day practice, the Car Construction Committee recommends that rules covering this subject, adopted as standard in 1922 and shown on pages 10-A and 10-B, section L, of the Manual, be modified. It is recommended that the present rules be allowed to remain without change but be supplemented by the addition of the following note: "Cast- or pressed-steel parts will be considered permissible alternates whenever malleable iron is mentioned in the above rules and it will also be permissible to weld, instead of rivet and solder, all brine-tank joints."

The sub-committee on the design of truck springs reports that the work on designs of coil springs for 50- and 70-ton capacity cars having greater capacity than the present designs is progressing but has not been completed.

The sub-committee on rail-motor-car axles reports progress and expresses the hope that definite designs can be submitted within the next year.

As a result of the increasing use of roller bearings under cars and locomotives the committee has been approached by several manufacturers with reference to a permissible increase in axle load at the journal on A.R.A. axles equipped with roller bearings. Inasmuch as an increase in permissible load would increase the stresses at the wheel seat and at the center of the axle, the whole question pertaining to both cars and locomotives will be given careful consideration during the ensuing year and will be referred to the committee in charge of A.R.A. axle design for an analysis of the stresses and their recommendation.

The sub-committee on loading devices in automobile cars is conducting an investigation with a view to preparing designs of representative devices suitable to the various types of automobile cars which, when completed, will be issued, with recommendations, in circular form.

The sub-committee on thermal checking of rolled-steel wheels is working with the wheel committee and the brake committee in an effort to determine the causes of excessive thermal checking. There is a possibility that an improvement in brake-beam construction used with the rolled-steel wheel to reduce the tendency of the brake shoe to overlap the outside edge of the wheel rim or the changing of the spacing of the brake shoes so that they will run closer to the flange of the wheel may offer some solution to the problem.

The sub-committee on journal-box lids is co-operating with manufacturers of side frames and box lids with a view to preparing specifications and can only report progress at this time.

**Axle Loads—Interchange Rule 86**—In the 1930 report of the committee reference was made to the fundamental principles of A.R.A. Interchange Rule No. 86 and a table presented showing the effect on axle loads due to variations in weights of wheels. It is the recommendation of the committee that, in view of complications which inevitably would result if variations in weights of various types of wheels were to be considered, no change be made in the present method of arriving at the railroad limits as prescribed in interchange rule No. 86 for the various sizes of axles.

The report was signed by P. W. Kiefer (chairman), chief engineer motive power and rolling stock, N.Y.C.; W. A. Newman (vice-chairman), chief mechanical engineer, C.P.R.; A. H. Fethers, general mechanical engineer, U. P.; C. L. Meister, mechanical engineer, A.C.L.; J. McMullen, superintendent car department, Erie; F. A. Isaacson, engineer car construction, A.T. & S.F.; W. O. Moody, mechanical engineer, I. C.; C. B. Smith, engineer tests, B. & M.; T. P. Irving, engineer car construction, C. & O.; S. O. Taylor, master car builder, M. P.; G. S. Goodwin, assistant general superintendent motive power, C.R.I. & P.; J. J. Tatum, general superintendent car department, B. & O.; E. B. Dailey, engineer car construction, S.P.; B. S. Brown, assistant engineer, Penna.; K. F. Nystrom, superintendent car department, C.M. St. P. & P., and J. P. Laux, superintendent motive power, L.V.

**Action.**—The report was accepted and necessary recommendations referred to letter ballot.

## Electric Rolling Stock

The major part of the report of the Committee on Electric Rolling Stock consists of a tabulation, showing the electric locomotives placed in service during the year ending June, 1931. The table lists the principal locomotive characteristics and includes ten locomotives for the New York, New Haven & Hartford, four for Chile, 14 for Switzerland, five for Norway, eight for Russia and 12 for Italy. This table was compiled with the cooperation of the Heavy Traction Committee of the American Electric Railway Engineering Association.

The report also records the completion of the Cleveland Union Terminal and Delaware, Lackawanna & Western electrifications and the installation of 43 three-powered, oil-battery-electric locomotives. Thirty-five of these have been placed in service on the west side lines of the New York Central, four on the Michigan Central, two in the LaSalle street, Chicago, terminal of the New York Central and two for switching service in conjunction with the Lackawanna electrification.

Concerning the development of alternating-current traction motors, the report states: "Electrification of certain sections of railroad has made some progress during the year, and it

is the thought of the committee that the progress will be more rapid in that a satisfactory single-phase, alternating current motor for locomotives has been designed. This new type motor is the result of the combined efforts of the two largest electrical manufacturing companies and they are now in position to build motors with identical characteristics and dimensions, which will permit interchangeability."

The committee consisted of R. G. Henley (chairman) superintendent motive power, N. & W.; J. H. Davis, chief engineer electric traction, B. & O.; J. V. B. Duer, electrical engineer, Penna.; J. W. Sasser, superintendent motive power, Virginian; R. Beeuwkes, electrical engineer, C. M. St. P. & P.; L. C. Winship, electrical engineer, B. & M.; H. A. Currie, electrical engineer, N. Y. C., and A. L. Ralston, mechanical superintendent, N. Y. N. H. & H.

**Action.**—The report was accepted.

## Safety in the Shop And on the Repair Track

By Charles G. Sebrell\*

In introducing his paper Mr. Sebrell pointed out the need of the supervising officer being thoroughly sold on the idea of safety himself before attempting to sell the idea to the organization. The efficient supervisor of today, he stated, must become thoroughly acquainted with the viewpoint of his men, hold friendly meetings with them and frankly solicit honest constructive suggestions. He stressed the need of a clean and orderly shop as a fundamental requirement of safety. Observance of goggle rules, he stated, was not brought about over-night nor have the improvements thus far made been easy of accomplishment. However, selling to the workman the idea that goggles were his individual insurance against any impairment of his vision has accomplished results that have been most gratifying both to the men and to the management.

In conclusion, Mr. Sebrell pointed out that safety must not be regarded as a philanthropic undertaking, but must also be considered as good business. The basic need in accident prevention, he said, is "supervision with a super vision," an ability to observe what is transpiring, and an efficiency that will stop minor irregularities before they become major offenses.

## Automatic Train-Line Connectors

In September, 1929, the joint committee on Automatic Train-Line Connectors representing the American Railway Association, the Bureau of Safety of the Interstate Commerce Commission and representatives of the four train-service brotherhoods, agreed that an investigation of automatic train-line connectors, including laboratory tests and road tests under actual service conditions should be made. This investigation was to be made by the American Railway Association cooperating with the Bureau of Safety and the train-service brotherhoods. The joint committee of the American Railway Association appointed a sub-committee to have direct supervision over the conduct of this investigation composed of the following members: C. E. Chambers, chairman of sub-committee, and chairman of Committee on Safety Appliances; R. L. Kleine, chairman of Committee on Couplers and Draft Gears; G. H. Wood, chairman of Committee on Brakes and Brake Equipment.

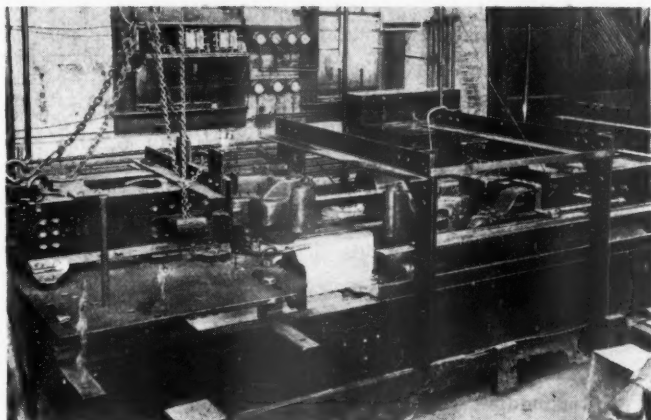
In undertaking this investigation the policy was adopted of making it extensive and complete and of giving each device the same opportunity to qualify for the tests as any other device. Forty-one companies or individuals have submitted plans, or specifications for our consideration. These plans are submitted to searching analysis and those devices having sufficient merit are being purchased in small quantities for testing in the laboratory.

### Tests

**Devices Purchased for Test**—Up to the present time six freight and six passenger connectors of each of the following types have been ordered: Robinson wing type, Robinson Connector Company; Robinson pin-and-funnel type, Robinson Connector Company; American, Consolidated Connector Company; Roberts, Roberts Automatic Connector Co., Ltd.; Workman-Robinson, Workman-Robinson Company; National, National Connector Company; Cobb, Cobb Connector Company.

\* Shop Safety Supervisor, Atchinson, Topeka & Santa Fe.





The Impact Machine Representing the Installation of Couplers, Draft Gears and Automatic Train-Line Connectors on the Ends of Two Cars

Prices have been requested on six freight and six passenger connectors from the McTaggart Connector Company, and the Johnson Connector Company, but orders for these connectors have not yet been placed. A further study of the specifications may indicate that the devices proposed by other manufacturers should be obtained and submitted to the laboratory tests.

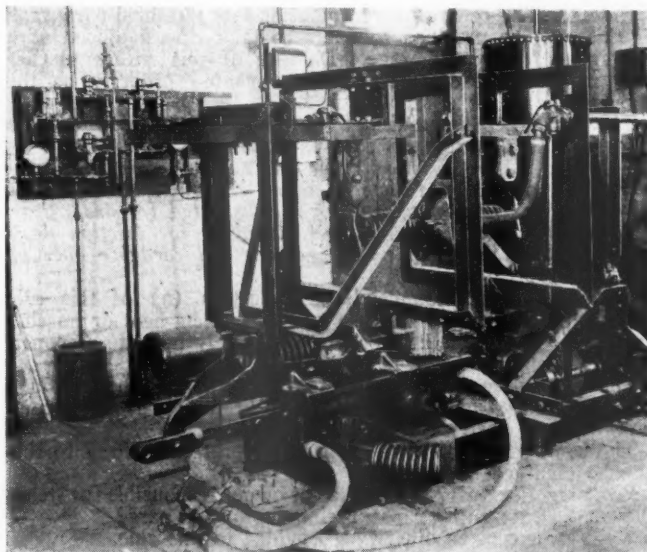
At the start of this investigation there were no specifications covering the requirements for automatic train-line connectors and no schedule of tests for these devices. A schedule of laboratory tests was prepared and copies forwarded to the Bureau of Safety, Interstate Commerce Commission, and to members of the committee having the matter in charge for the railroads. Criticisms and suggestions were invited and the schedule revised to include the suggestions received.

**Testing Machines**—Two testing machines, designed to carry out the tests specified in the schedule, were purchased and installed in the laboratories of Purdue University. The No. 1 or impact machine represents the installation of couplers, draft gears and train-line connectors on the ends of two cars. On this machine the action of the connectors is being studied with the drawbars in various positions of height, angularity representing laterally curved track, and in different positions of lateral off-set.

The No. 2 or oscillating machine is designed to study the action of the connectors and the wear on their various parts due to continual coupling and uncoupling and due to horizontal and vertical movements such as would be produced on a moving train.

[The report indicates that laboratory tests have already been made or are in progress on Robinson wing type and pin-and-funnel type freight connectors, the American freight connector and the National freight connector, and will be continued until each type which will be purchased has been tested.—EDITOR.]

The laboratory tests should select those devices which have



The Oscillating Machine for Studying Connector Action Due to Horizontal and Vertical Movements

sufficient merit to warrant their further study under actual service conditions in road tests.

The report was signed by H. A. JOHNSON, director of research, A.R.A.

*Action*.—The report was accepted.

## Brakes and Brake Equipment

Our inspection of some reclamation plants reveals the fact that there are numerous types or designs of brake beams of varying dimensions, all of which, no doubt, originally met the brake-beam test requirements. These various dimensioned brake beams quite naturally came into existence due to the absence of definite and fixed dimensions.

The brake beam manufacturers undoubtedly sought to give the best possible brake beam for the lowest possible cost, which prompted them to employ structural shapes and designs most conveniently obtained. It is only fair to state that the railroads, for the most part, purchased brake beams from the most favorable quotations regardless of the type, quality of material or workmanship, thus contributing their share to the present conditions. Therefore, of necessity the present condition involves one of two things where standardization is desired, i. e., the railroads must carry stocks of the many varieties, shapes and styles of brake-beam parts in order to maintain the brake beam designs that the present market provides, or scrap such beams and their parts removed from cars in interchange as will not interchange to the road's standard.

For many years the A. R. A. manual has shown the association's standard brake beam not only by important dimensions, but also by shape of parts and their structure, but the necessary details for standardizing have been absent. Therefore, we have made no change in the present standard except to add thereto additional information so as to provide for complete details of standard No. 2 plus brake beam. In preparing these details we sought to specify such materials as are commercially obtainable, and such dimensions as may be conveniently met. The workmanship and inspection, in our opinion, will be a matter for the purchaser.

[The committee here included drawings giving recommended detail dimensions of standard No. 2-plus brake beam parts and devoted several paragraphs to an explanation of the reasons for the design and dimensions shown. It suggested the adoption of these details as recommended practice and called attention to the fact that A. R. A. brake-beam gages would need corresponding revision. In order to protect brake-pipe and signal couplings against damage by being incorrectly connected to signal-hose and brake-pipe-hose dummy couplings, respectively, the committee recommended two designs of dummy coupling which can be readily distinguished one from the other. The Subcommittee on Standardization of Contour Lines and Steam-Hose Couplings made a careful survey of general coupler-head conditions, finding much irregularity, and recommended a definite radius of the gasket seat in the coupler head as well as certain other details of construction, and gages for checking new heads. The committee studied the location of air, signal, train-line and steam-head pipe on passenger-equipment cars, finding a wide variation in practice without any apparent reason in most cases. A drawing showing a recommended standard location was included in the report. The committee reported that the new triple-valve graduating spring, adopted last year, is not being applied as rapidly and generally in freight equipment as desirable in order to eliminate undesired emergency action during service operation, and recommended that the older type springs be removed and scrapped whenever triple valves are cleaned and repaired.—EDITOR.]

This committee was requested to cooperate with the committees on wheels and car construction in investigating the subject of thermal-checked steel-tread wheels, and in joint session at Chicago on April 8 it was the consensus that in-so far as concerns brakes and brake equipment, the situation might be relieved somewhat through: Improvement in brake beam constructions and design, so as to reduce the tendency of brake shoes to overlap the outside edge of the wheel rim; better maintenance of foundation brake gear on trucks to reduce tendency of brake shoes overlapping outside edge of wheel rim; improvement in quality of brake shoes to eliminate, or minimize, groove cutting in wheels which in turn is conducive to thermal checking.

The question of brake shoe material is a broad one, and we believe should be investigated jointly by the Committees on Wheels, Specifications and Tests for Materials, and Brakes and Brake Equipment.

The report was signed by G. H. Wood (chairman), supervisor air brakes, Atchison, Topeka & Santa Fe; T. L. Burton, air brake engineer, New York Central; B. P. Flory, super-

intendent motive power, New York, Ontario & Western; R. C. Burns, assistant engineer, Pennsylvania; W. J. O'Neill, general mechanical superintendent, Denver & Rio Grande Western; W. H. Clegg, chief inspector air brake & car heating equipment, Canadian National; Mark Purcell, general air brake inspector, Northern Pacific; R. B. Rasbridge, superintendent car department, Reading; G. E. Terwilliger, supervisor auxiliary equipment, New York, New Haven & Hartford; M. A. Kinney, general master mechanic, Chesapeake & Ohio; H. A. Clark, general air brake inspector, Minneapolis, St. Paul & Sault Ste. Marie.

**Discussion.**—Representatives of several railroads concurred in the opinion that the weakest point in present brake-beam design is the brake head, which is too rapidly cut out by the brake shoe, owing to the lack of adequate bearing surface between the shoe and the head. A design of brake head improving this condition, which was developed by J. McMullen, superintendent of the car department of the Erie, and submitted to the Committee on Brakes and Brake Equipment by the Car Construction Committee, was commended by representatives of railroads which have applied heads of this type. In view of the strong sentiment for the improvement of this feature of the brake-beam design it was referred back for further development jointly by the Committee on Brakes and Brake Equipment, the Car Construction Committee, and the Committee on Specifications and Tests for Materials. In view of the belief that many reclaimed brake beams are going into service which are not of adequate strength, a motion was carried that the committee be asked to develop standards to which rebuilt or repaired brake beams must conform.

The remainder of the report was submitted to letter ballot, as recommended by the committee.

## Report of Arbitration Committee

During the year Cases 1656 to 1683, inclusive, have been decided and copies forwarded to the members.

As announced in the report to the 1929 Annual Meeting, investigation has been made to ascertain if it would be practicable to reduce billing costs by elimination of detail labor charges and overhead, and the use of an arbitrary percentage to be added to the material costs. The report of the sub-committee on this subject is attached. As a result of analysis of the data accumulated in this study, your committee has approved the recommendation of this sub-committee that the proposed plan be abandoned.

**Rule 2**—The committee recommends that Section (j) of this rule be modified to include section (d) of the Safety Appliance Acts to definitely indicate reason for rejecting equipment in violation of Section (d) of this Act.

**Rule 3**—The committee recommends that no extension be made in the effective date of fifth paragraph of Section (b). The committee recommends that note following first paragraph of Section (c) be modified, effective August 1, 1931, to authorize use of the Type E coupler adopted as recommended practice by letter ballot.

The committee recommends that the effective date of the last sentence of Section (d) and that the effective dates of the first and second paragraphs of Section (f) be extended to January 1, 1933, the present situation justifying these extensions.

The committee recommends that the exception in the fifth paragraph of Section (t), governing the interchange of cars used in transporting commodities such as asphalt, fuel oil, lubricating oil, be modified to include those cars used in transporting syrup, corn oil, molasses, grease, soap stock etc.

The committee recommends that no extension be made in the effective date of the sixth paragraph of Section (t) and that the same be modified, effective August 1, 1931, to except tank cars used in transporting commodities such as lard, soap stock, grease, molasses, syrup, etc., and so stenciled.

The committee recommends that the effective date of the seventh paragraph and eighth paragraphs of Section (t) be extended to January 1, 1933. It is the intent that no further extension of the requirement in the eighth paragraph of Section (t) will be granted.

The committee recommends, as a safety measure, a new last paragraph to Section (t), to read as follows:

**Proposed Form**—(t) (12) Tank cars with dome covers not secured to tank by means of hinge or chain will not be accepted after January 1, 1933. From Owners.

**Rule 4**—The committee recommends that Section (c) of this rule be modified, as follows:

**Proposed Form**—(c) Refrigerator cars. When sheathing is split, broken, raked full width of board into wood to bottom of bead, or when raked into wood to lesser depth (whether

or not full width of board) if such rake damage is in excess of four inches measured vertically, or where combined vertical width of two or more such rakes is in excess of four inches (within a vertical distance of twelve inches). (Bottom of bead on A. R. A. Standard sheathing is  $\frac{1}{8}$ -in. below outside face of sheathing.)

The committee recommends that Section (f) of this rule be modified by adding the following phrase to the Section as it now stands: "or in the case of box or stock cars, single-sheathed, where the bending of posts or braces by raking prevents the proper operation of side doors."

The committee recommends that Section (g) of this rule be modified as follows:

**Proposed Form**—(g) All Cars. Metal end sill when straightening of same is necessary for proper operation of uncoupling apparatus, or dumping device; to restore safety appliances to original alinement or to repair cardable directly associated defective parts.

The committee recommends the addition of new second paragraph to Section (g), to read as follows:

**Proposed Form**—Defect card shall not be required for damaged push-pole pocket when not directly associated with other delivering-line defects.

The committee recommends that Section (j) of this rule be modified, as follows:

**Proposed Form**—(j) When a car is received home with unfair usage defects covered by defect card; or in any other cases where cars damaged by unfair usage are interchanged with visible defects covered by defect cards; upon arrival of cars at owners' shops, if it develops that there are associated defects due to unfair usage, joint inspection, within 90 days after first receipt of car home, shall be made by representative of car owner and a representative of a disinterested railroad, or by a chief interchange inspector, showing list of the defects covered by the defect card as well as list of additional associated unfair usage defects which, in their opinion, occurred at same time (except interior fire damage per Rule 32, Section "k"). Such joint inspection certificate shall be forwarded to the road issuing the defect card who shall issue defect card to cover such additional defects.

**Rule 8**—The committee recommends that a note reading "Must not have carbonized back" be added to the wheel and axle billing repair card forms shown on pages 220 and 221 of the current Code of Interchange Rules. Carbonized backs deface billing repair cards and are unsuitable for filing purposes.

**Rule 9**—The committee recommends that third requirement opposite item of "A. R. A. couplers, or parts thereof, R. & R." be modified, effective August 1, 1931, as follows:

**Proposed Form**—(Where  $12\frac{1}{4}$ -in. head coupler, A. R. A. type D coupler or A. R. A. type E coupler is removed or applied, it must be so stated.)

**Rule 17**—The committee recommends a new paragraph to Section (c) of this rule, effective August 1, 1931, to read as follows:

**Proposed Form**—Type E Recommended Practice coupler, or coupler having type D head designed with swivel or radial butt, should be replaced in kind when available; otherwise same may be replaced with A. R. A. Standard type D, 6 by 8-in. shank couplers, and such substitution shall not constitute wrong repairs.

**Rule 32**—The committee recommends that the third paragraph of this rule be modified to apply to tank cars equipped with bolster of center anchorage. Damage of this nature to cars equipped with head-block anchorage should properly be the responsibility of the car owner.

The committee recommends the addition of a new seventh paragraph to this rule, to read as follows:

**Proposed Form**—Friction draft gear missing complete in interchange, including followers when missing in connection therewith, or when wooden block is substituted for draft gear. (The substitution of springs and followers for friction draft gear will be considered wrong repairs and cardable only by company applying same.)

The committee recommends that Section (a) of this rule be modified, to include loose as well as broken, bent or missing part causing derailment in order to definitely indicate responsibility in such cases.

The committee recommends that Section (o) be modified by eliminating the word "Also" at the beginning of the second paragraph, to clarify the intent of the rule.

The committee recommends that Interpretation No. 7 to this rule be modified, as follows:

**Proposed Form**—(7) Q.—Is a car owner responsible for steam inlet and steam outlet caps missing from tank cars?

A.—Yes, except as otherwise provided in this rule.

**Rule 35**—The committee recommends that last sentence of note following this rule be modified in the next supplement, as follows:



**Proposed Form**—Doors equipped with locks having two notches must be engaged and locked in second notch on at least one side of door (providing maximum opening does not exceed three inches), to be considered safely secured in closed position.

**Rule 36**—The committee recommends that the third paragraph of Section (1) be modified to include the statement: "No card with red background permitted." To avoid conflict with I.C.C. Regulations for Transportation of Explosives and other dangerous articles. This recommendation has been approved by the Transportation Division.

The committee recommends, that, for same reason given above, the following sentence be added to the second paragraph of Section (2) of this rule: "No printing in red type or in any color on red background permitted."

**Rule 44**—The committee recommends that to clarify the intent, Section (1) of this rule be modified by including the following sentence: "(Any sill broken partly old at point of breakage will not be considered in this combination.)"

The committee recommends that to clarify the intent, Section (2) be modified as follows:

**Proposed Form**—Composite wooden and steel underframe cars. When five or more steel or wooden longitudinal sills are damaged, providing three or more of the steel or wooden longitudinal sills are broken entirely new at point of breakage.

The committee recommends that Section (3) and Interpretation 2 to this rule be eliminated, and Section (5) modified, as follows:

**Proposed Form**—(5) All-steel underframe cars having two or more steel longitudinal sills. When two steel center sills are damaged between body bolsters. When the damage is confined to the sills between the end sill and body bolster, owner will be responsible, providing after investigation it is found that car was not subjected to unfair handling as provided by Sections (a), (b), (c), (e), (f), (m) and (o) of Rule 32.

**Reason**—To eliminate side or intermediate sills as combination factors on all-steel underframe cars. It is felt present Rule 44 affords more protection to steel underframe cars with weak center-sill construction but having side sills, than it does to the more substantial A. R. A. center-sill construction without the side sills, while the impact shocks are not transmitted to the side sills in steel underframe construction but are concentrated upon the center sills. The use of all longitudinal sills as combination measure in wood underframe and composite wood and steel underframe, is consistent, in view of the end sill and body bolster transmitting the impact shocks to all such sills in more or less degree.

The committee recommends that to clarify the intent, Section (6) be modified as follows:

**Proposed Form**—(6) Steel tanks of tank cars, where secured by bolster or center anchorage, if shifted account of all anchor bolts, or rivets being sheared off. *Note*—Tanks shifted account elongation of bolt or rivet holes, where any of the bolts or rivets are still in place, is owner's responsibility.

**Rule 60**—As a measure of economy and to expedite the work when the spray method of painting is employed, the committee recommends that section (f) of this rule be modified as follows:

**Proposed Form**—(f) All old cleaning marks must be scraped off and painted over with quick-drying paint, preferably black.

The committee recommends that Section (i) of this rule be modified, as follows:

**Proposed Form**—(i) In the event air brakes are cleaned, due to being inoperative, within nine months from date of last previous cleaning, car owner is responsible, except under the following conditions:

1. If cleaned by same road within sixty days from date of last previous cleaning, charge for such subsequent cleaning is not permissible, except where due to broken cylinder, triple valve body or check valve case, account owner's responsibility.

2. If cleaned by different roads, or by private car lines, within sixty days from date of last previous cleaning charge for such previous cleaning (per Items 18, 23 and 29, Rule 111) shall be withdrawn; except where last cleaning was occasioned by delivering line defects, or due to broken cylinder, triple valve body or check valve case, account owner's responsibility.

3. Where last previous cleaning was due to delivering line defects (for which no bill was rendered against owner), the road performing same shall issue counter-billing authority for the expense of the subsequent cleaning, if performed within sixty days from date of such previous cleaning, upon presentation of copy of billing repair card of road rendering bill against owner, except where such subsequent cleaning was due to broken cylinder, triple valve body or check valve case, account owner's responsibility.

4. In any case, where such subsequent cleaning within sixty days is performed by car owner, joint evidence per Rule 12 shall be used to establish the defective condition which occasioned such cleaning.

**Rule 87**—The committee recommends that to clarify the in-

tent, the phrase, "on basis of sufficient evidence," be eliminated from the fourth paragraph.

**Rule 102**—The committee recommends that the third sentence of the second paragraph of this rule be modified to read:

**Proposed Form**—The same scale will apply to width, except for matched sheathing, roofing, lining and flooring, on which for finished width up to and including 3½ in., consider as 4 in. rough; over 3½ in. up to and including 4½ in., consider as 5 in. rough; over 4½ in. up to and including 5½ in., consider as 6 in. rough; and upward on corresponding scale.

**Rule 104**—The committee recommends that fourth paragraph of this rule be modified, effective August 1, 1931, as follows:

**Proposed Form**—In the case of type "E" Recommended Practice coupler, or swivel butt coupler (including swivel butt casting and pin), or radial butt coupler (including radial butt casting), removed account defective, credit for second-hand parts shall be at 75 per cent of prices new as shown in Rule 101. In case of complete type "E" Recommended Practice coupler or coupler having type "D" head designed with swivel or radial butt, missing under the provisions of Rule 95, and substituted with A. R. A. type "D" Standard 6 by 8-inch shank coupler, the car owner shall be allowed credit, if any, for the difference in value between second-hand coupler missing and second-hand value of coupler applied.

**Rule 113**—On account of the order of the Interstate Commerce Commission, I.C.C. Docket No. 17,801, relative to Per Diem Rules, the committee recommends that the second paragraph of this rule be eliminated, effective August 1, 1931. Your committee will give further consideration to this subject.

**Rule 120**—The committee recommends that repair limits for labor on car body per Section (b) of this rule be modified, repair limits for labor on tank cars complete be \$50 and Section (d) modified as follows:

**Proposed Form**—(d) In no case shall the total charge for actual repairs to body of all-steel or steel-underframe cars, or tank cars complete, exceed the estimate by more than \$50, or on other types of cars by more than \$25, exclusive of betterments, unless authorized.

**Reason**—To provide greater measure of protection against heavy repairs to units which car owner may not desire to maintain; also, to provide limits for repairs to tank cars without authority from car owner.

[The proposed limits for labor charges on car-body repairs, included in tabulated form under Section (b) of Rule 120, not included here, show for each type of car of wooden construction a reduction under the present allowances. The reductions vary from 25 per cent to 50 per cent of the present allowances.—EDITOR]

**Passenger Rule 2**—The committee recommends that the effective date of the first sentence of Section (c) of this rule be extended to October 1, 1932 since the present situation justifies the extension.

The committee recommends that a new Section (d) be added to this rule, to read as follows:

**Proposed Form**—(d) Effective January 1, 1933, where cars are equipped with platform safety chains, same shall be located as follows: When facing end of car, the chain fitted with hook shall be on the left-hand side, and the chain fitted with eye on the right-hand side.

**Passenger Rule 7**—The committee recommends the addition of a new fifth sentence to Section (j) of this rule, to read as follows:

**Proposed Form**—Triple valve may be cleaned separately if defective within time limit, including separate stenciling.

The committee also recommends that a new note be added to Section (j), to read as follows:

**Proposed Form**—*Note*. When U-12-BC type of U. C. control valve is removed, it should be replaced in kind, or, if replaced by U-12 or U-12-B valve, proper credit must be allowed car owner as outlined in notes following Item 20-C of Passenger Rule 21. In the substitution of the U-12-BC valve for defective U-12 or U-12-B valve, car owner is not responsible for the betterment.

**Passenger Rule 8**—The committee recommends that Section (g) of this rule be modified to include metallic steam-heat connector since these connectors should receive the same protection as missing steam hose.

**Passenger Rule 9**—The committee recommends that a new note be added to Section (d) of this rule, to read as follows:

**Proposed Form**—*Note*. For terminal lubrication on passenger equipment cars in through line service, an arbitrary allowance of fifty cents (labor and material) per car, shall be charged.

### Report of Sub-Committee on Cost of Car-Repair Billing

An analysis of 1,559 monthly incoming bills showed that the percentage of labor to material, as appearing in these bills,

fluctuated from approximately 41 per cent to 72 per cent, while the weighted average percentage of labor to material in all such bills was 51.7 per cent.

The theory is that to the material charge for straight repairs appearing in a bill, the weighted average of 51.7 per cent should be added as representing labor. It was decided by the sub-committee that such an arrangement would not work out equitably for all concerned.

The question of including bills rendered on authority of defect cards on a similar basis was also considered but on account of the exceptionally wide range of percentage labor to material it was decided the proposed plan would be highly inequitable and therefore impracticable of application.

From an analysis of the accumulated data covering this subject, the sub-committee is unanimously of the opinion that the plan for adding an arbitrary percentage to material costs to cover labor, in lieu of the present detailed labor charges, should be abandoned.

The report of the Arbitration Committee was signed by T. W. Demarest (chairman), general superintendent motive power, P. R. R.; L. Richardson, chief mechanical officer, B. & M.; F. W. Brazier, assistant to general superintendent motive power and rolling stock, N. Y. C.; J. J. Hennessey, assistant superintendent car department, C. M., St. P. & P.; G. E. Smart, chief of car equipment, C. P. R.; C. T. Ripley, chief mechanical engineer, A., T. & S. F.; G. F. Laughlin, general superintendent, Armour Car Lines; Thos. Beaghen, Jr., superintendent car maintenance, Mexican Petroleum Corporation.

**Discussion.**—A somewhat extended discussion followed the reading of the report by Chairman Demarest. In connection with the welding of car axles, one of the members stated that his road has followed the general practice of building up worn collars by welding for several years, and asked if any failures as a result of this method of reclaiming car axles have occurred on any roads. Apparently no such failures are recorded, but the opinion was expressed that in the interests of safety all welding of every description on car axles should be eliminated, and it was stated that reforging to the next smaller journal diameter with the formation of complete new collars and standard journal lengths not only is practicable from the point of view of economy, but refines and anneals the metal, making it superior to that in the new axle.

The question of cross-billing and the exchange of "wooden money" as a result of present methods of billing for repairs to foreign equipment came in for a lengthy discussion. The cost of this billing on American railroads was stated to be in the neighborhood of \$3,500,000. The feasibility of eliminating billing entirely has been considered by the Arbitration Committee and prominent executives in the Mechanical Division for years, the stumbling block being what to do in the case of privately-owned equipment. The suggestion was advanced that in case it proves impracticable to do away with billing entirely, a large proportion of the work can be eliminated by reducing the number of items for which bills can be rendered. The idea was also advanced that possibly central or regional billing bureaus, provided with the latest equipment and methods, could be established as clearing houses to eliminate individual road billing.

In closing, Chairman Demarest invited an informal expression of opinion regarding the four following questions:

Are you in favor of the entire elimination of car-repair billing?—Considered impractical.

Do you favor a continuation of present billing methods, modified so as to reduce the volume of work?—Approved.

Should the number of car repair billing items chargeable to the owner be reduced?—Generally approved.

Should the Arbitration Committee give further consideration to the possibilities of developing central or regional bureaus, under the supervision of the American Railway Association, to serve as clearing houses and eliminate individual road billing?—Approved.

The report was accepted and ordered submitted to letter ballot.

## Prices for Labor and Material

**Rule 101**—All miscellaneous material prices in Rule 101 were rechecked as of March 1, quotations from purchasing agents of eleven railroads, representing 39 per cent of total freight-car ownership in the United States and Canada, indicating a general downward trend in material markets.

New Item 54-B is recommended to cover credit for scrap triple valves. New Items 124-A to 124-J are recommended, covering charges and credits for type E coupler and parts thereof. New Item 200 is recommended, covering the 200,000-lb. capacity axle. Two new items have been added and one item revised in table of friction-draft-gear prices, to cover

additional types of such gears. The prices of a number of gears shown in this table have also been revised.

Investigation by your committee of weights used for new and scrap wheels and axles in setting up A. R. A. material prices, developed some modifications necessary; and the new average weights obtained as a result of this investigation have been used in setting up new allowances for these items in both freight-car Rule 101 and passenger Rule 22.

Investigation has been conducted by your committee in conjunction with the Purchases and Stores Division, as to correctness of percentages for store expense and interest on investment used in making up material prices for the Interchange Rules. The percentages being used for this purpose are correct and no change is recommended at this time.

No change is warranted at this time in the hourly labor allowances.

**Rule 107**—Item 159 is eliminated, account confliction with Rule 108.

**Rule 111**—Item 4 is modified, by eliminating the words "retaining valve," to clarify the intent.

**Rule 112**—Recommendations are made in Rule 112 respecting reproduction pound prices of new freight-train cars of all classes in order that Supplement of August 1, 1931, may reflect 1930 costs in lieu of 1929 figures shown in present Code. The prices submitted for your approval will be found to follow the trend which occurred in the 1930 market covering total new equipment purchases as compared to 1929. Pound prices for refrigerator and tank cars are based on figures furnished by representative roads and private lines in the United States and Canada. Prices for all other equipment represent the average selling prices set up by the President's Conference Committee, which secured quotations on total output of several large U. S. car manufacturers.

**Passenger Rule 21**—Item 17-A is eliminated, account covered by new Items 38-D and 38-E of passenger Rule 22. In order that car owner may be properly compensated in substitution of U-12-B for U-12-BC type of control valve, your committee is recommending new last note under Item 20-C to provide proper credit in such cases. New Item 20-H is added to provide charge for separate cleaning of safety valves.

**Passenger Rule 22**—Changes in material prices in a number of items under this rule are recommended, based on quotations as of March 1 from the purchasing agents of eleven representative railroads. Item 35 covering coach oil is eliminated and Item 34 modified to cover all lubricating oil. New Items 38-A to 38-E, inclusive, are recommended to provide charges and credits for metallic steam connectors and parts thereof.

[The changes recommended in the existing rules are shown in detail in tables which are not included here.—Editor.]

The report was signed by A. E. Calkins (chairman), superintendent rolling stock, N. Y. C.; Ira Everett, consulting master car builder, L. V.; F. J. Dodds, general car inspector, A. T. & S. F.; P. Kass, superintendent car department, C. R. I. & P.; O. A. Wallace, supervisor car repairs, A. C. L.; T. J. Boring, general foreman, M. C. B. Clearing House, Penna.; H. H. Harvey, general car foreman, C. B. & Q.; H. H. Boyd, assistant chief motive power and rolling stock, C. P. R.; A. E. Smith, vice-president, Union Tank Car Company; A. H. Gaebler, superintendent car department, General American Transportation System, Inc.

**Action.**—The report was accepted.

## Automotive Rolling Stock

The Automotive Rolling Stock Committee devoted its efforts for the year 1930-1931 to activities which could be handled by correspondence. Notwithstanding certain limitations extensive data were collected on three subjects of interest to the railroads operating rail motor cars, as follows: 1. Rail motor cars put in service since 1923; 2. Depreciation of rail motor cars and equipment; 3. Crank-case oil reclamation.

Questionnaires were sent out and replies received from 115 railroads. Among these 115, sixty-two operate rail motor cars and include practically all of the principal operators of such equipment in North America. Hence, the information obtained can be considered quite representative.

**Rail Motor Cars Put in Service Since 1923**—The committee presented a table giving in considerable detail information concerning all of the rail motor cars which have been placed in service since 1923. Up to and including 1930 the total number of such cars placed in service was 730. The table shows the cars by ownership and gives the year placed in service; the type and capacity of the power plant; the overall length of the car; the lengths of the engine, baggage, mail and passenger compartments; the seating capacity, and weight.



**Depreciation**—Three questions were submitted to the railroads requesting information on depreciation practices.

Of the 62 railroads reporting on their rail motor cars, 60 stated such cars were depreciated. One railroad reported no established rate for depreciation and one railroad reported no depreciation of rail motor cars. Of the 60 railroads, 27 reported using an over-all depreciation rate covering both car body and motive-power apparatus. Such over-all rate varied from two per cent to fifteen per cent with a mean rate of about 6.5 per cent. The remaining 33 railroads reported different rates applied to car body and motive-power apparatus. Car body depreciation rate varied from 1.8 per cent to six per cent with a mean rate of about four per cent. Motive power apparatus depreciation rate varied from 3.288 per cent to 20 per cent with a mean rate of about 10 per cent. There was a disposition on the part of a few railroads to apply depreciation rates differently or in more detail.

**Crank-Case Oil Reclamation**—Included in the questionnaire sent out to the railroads were seven questions relative to the reclamation of crank-case oil. Of the railroads questioned 25 reported reclaiming crank-case oil. Two railroads stated that such reclamation was performed by an outside agency. The remainder reported no reclamation of crank-case oil. A variety of makes and types of apparatus was used for such reclamation.

Among the 24 railroads reporting definite cost per gallon for reclamation, the minimum cost was 8.4 cents per gallon and the maximum 24 cents, with a mean of about 15.5 cents per gallon. This cost is quite significant as it indicates the substantial saving over the cost of new oil which can be realized by the reclamation of used crank-case oil.

The consensus of opinion relative to comparison of reclaimed oil with new was that the former compared about equally well with new oil.

The report was signed by P. H. Hatch (chairman) engineer of automotive equipment, N. Y., N. H. & H.; H. F. Finne-more, assistant electrical engineer, C. N. R.; B. N. Lewis, mechanical superintendent, M., St. P. & S. S. M.; F. K. Fildes, assistant engineer, P. R. R.; W. J. Wilson, chief motor-car draftsman, U. P.; J. R. Jackson, engineer of tests, M. P., and E. Wannamaker, electrical engineer, C., R. I. & P.

*Action*.—The report was accepted.

## Report of the Wheel Committee

The Committee on Wheels recommended that the specifications for chilled-iron wheels adopted as standard in 1917 and revised in 1926 be again revised and submitted to letter ballot as standard practice. The proposed revisions specify that the depths of clear white iron shall not vary more than  $\frac{1}{4}$  in. around the tread; if a test wheel cracks in the plate with nine blows or less, it will be considered as having failed, and that the height of the drop for an 850-lb. wheel be increased from 13 ft. to 15 ft. A considerable portion of the report was devoted to a revision of the specifications for chilled-iron wheels with respect to eventual practice requirements. The proposed revisions also added the following to the specifications: "The plane of the flange when gaged on the face at  $\frac{5}{8}$  in. above the base line of the tread, shall not vary more than  $\frac{1}{16}$  in."

In discussing the proposed revisions to the specifications, the committee points out that it is not its intention to suggest the checking of each wheel by inspectors to detect a variation in the plane of the flange to  $\frac{1}{16}$  in., but the clause should be inserted as protection in case the condition is encountered in any particular wheel foundry. Generally, warpage is discovered in the wheel plant or when the wheels are chucked in the boring mill.

The attention of the committee was directed during the past year to the condition of some of the second-hand wheels applied to foreign equipment. A considerable number of wheels are reported as being out of round and thin chilled. The committee will co-operate with the Arbitration Committee in an investigation of this question.

The report stated that a considerable number of wheels are being permitted to run, and in some cases wheels are possibly being applied to cars, on which the chill has been worn through. The committee also called attention to the importance of the new proposed Rule 83 which prohibits the application of wheels weighing less than 650 lb. and 700 lb. nominal weight, regardless of date cast. The committee recommended that no extension in date be granted for this rule and that it should become effective January 1, 1932.

The report is signed by A. Knapp (chairman), inspecting engineer, N. Y. C.; C. T. Ripley, chief mechanical engineer, A. T. & S. F.; O. C. Cromwell, assistant to chief of motive power and equipment, B. & O.; H. W. Jones, general superintendent of motive power, central region, Penna.; H. W. Cod-

dington, engineer of tests, N. & W.; J. Matthes, chief car inspector, Wabash; C. Petran, supervisor of tools and machinery, C. M. St. P. & P., and A. M. Johnsen, engineer of tests, Pullman Company.

*Action*.—The report was accepted.

## Report on Tank Cars

During the year the committee considered approximately 125 dockets and applications for approval of design, covering 1518 cars, of which 1155 were Class I.C.C.—103.

**Forge Welding**—During the year question was raised as to whether certain methods of forge welding fully met the intent of the specifications for class 105 cars. The tank car committee have under way at the present time a comprehensive series of tests of welded containers made by different methods of forge welding.

**Dome Closures for Class I. C. C. 104A Cars**—During the year the committee started some studies of the various designs of dome closures used on Class 104A cars, with a view to making certain recommendations which will tend to standardize these closures, and at the same time not unduly restrict development of the art. It is hoped to complete this work during the coming year.

During the past year the chief inspector of the Bureau of Explosives proposed certain revisions in the regulations which would make safer the transportation of inflammable liquids having a vapor pressure exceeding 16 lb. absolute. The committee concurred in Colonel Dunn's recommendation, and this has made it necessary to do considerable work in connection with checking over designs of dome closures proposed to replace generally the present screw type cover, and which would meet the new regulations.

**Reversible Placard Holders on Tank Cars**—For some time there has been discussion about the requirements for placard holders on tank cars. The committee now presents a design, which is free from patents and seems to meet fully all of the requirements of a reversible placard holder. The committee recommends that on and after January 1, 1932, all tanks, which are applied to new underframes, shall be provided with permanent metal placard holders at least equal to this design, and that on all cars receiving general repairs these, or equal metal placard holders be applied. The particularly desirable feature of the arrangement is that the cards are easily applied without the use of tacks, and it is almost impossible to lose them. The committee recommends that this proposed rule, and the drawing, be submitted to letter ballot for action by the association.

**Specifications for Class A. R. A. 203 Cars**—When the tank car specifications were submitted to letter ballot last year, it was thought unnecessary to provide a separate specification for Class 203 Cars. It was concluded later that the 203 specification in effect should be included, and the following note was inserted in the specifications for tank cars to cover the 203 design:

"Tank Cars required for the transportation of commodities not covered by the Regulations for the transportation by rail of explosives and other dangerous articles by freight are required to be built in accordance with I. C. C. Shipping Container Specification 103 but may be equipped with approved appurtenances or appliances necessary to the transportation of such commodities in tank cars.

"All tanks so built shall be stenciled A. R. A.—203 . . . . . only. The blank to specify the particular commodity requiring the special appurtenances or appliances in question."

**Weight of Loaded Tank Cars at Rail**—During the year the committee has had one or two cases in which, due to later deciding to handle a heavier commodity in a tank car than that for which it was designed, it was found that the trucks would be overloaded. The heaviest commodity which will ever be handled in these cars should be used in determining the total weight at rail so that a suitable capacity truck will be used. It is not considered a safe practice to load tank cars less than shell-full.

**New Developments**—During the year there have been several rather special types of cars built, requiring special material or treatment to prevent either contamination of the article carried or rapid deterioration of the tank structure itself. There may be mentioned the following:

- 1—6,500-gal. tank with lead lining.
- 3—40-ton, 3,000-gal., Class ICC-105A300 unlagged cars for transportation of ethyl fluid.
- 1—40-ton, 6,000-gal., Class ICC-103-B insulated tank car for transportation of formaldehyde.
- 1—40-ton, 5,000-gal., Class ICC-103, five compartment car for transportation of petroleum products.

- 4—100-ton, 12,000-gal., Class ICC-103-A cars for transportation of sulphuric acid.
- 1—Ethyl fluid tank car for transportation of ethyl compound.
- 2—Three-plate aluminum, Class ARA-201A35, tank cars for transportation of glacial acetic acid and formaldehyde.
- 3—8,000-gal., nickel-clad tank cars for transportation of iron-free caustic soda.
- 4—8,000-gal. double-wall tank cars with stainless-steel inner tanks.

**Specification 107 Helium Cars.**—This specification is in the process of revision, looking toward possibly three specifications, one for thick-walled vessels (walls  $2\frac{1}{2}$  in. and over) one for thinned-walled vessels (walls less than  $2\frac{1}{2}$  in.) and one for autogeneously welded construction.

The report was signed by G. S. Goodwin (chairman), assistant to general superintendent motive power, C. R. I. & P.; A. G. Trumbull, chief mechanical engineer, C. & O.; George McCormick, general superintendent motive power, S. P.; F. A. Isaacson, engineer car construction, A. T. & S. F.; W. C. Lindner, chief car inspector, P. R. R.; G. A. Young, head, school of mechanical engineering, Purdue University; A. E. Smith, vice-president, Union Tank Car Company; T. Beaghen, Jr., superintendent car maintenance, Mexican Petroleum Corporation; F. G. Lister, assistant superintendent motive power, St. L. S. F.; G. E. Tiley, supervisor tank car equipment, General Chemical Company; C. C. Meadows, Tidal Refining Company.

**Action.**—The report was accepted and referred to letter ballot.

## Committee on Loading Rules

As a result of the investigations, your Committee submits the following recommendations for changes and additions in the rules and figures for your approval and submission to Letter Ballot for adoption by the Association.

[The committee submitted a set of instructions prohibiting the use of temporary advertisements on cars and specifying the size and character of routing cards, commodity cards, special placards, symbol and A. R. A. cards, and special cards required by federal or state governments, and regulations concerning their use, which it proposes for inclusion in the Loading Rules because of requests from several shippers. In some cases the shippers have supplied themselves with a card which did not comply with Interchange Rule 36, and when their attention was called to this fact they stated that if they had known this they would have complied with the rule.—EDITOR].

### General Rules for Loading Materials

**Rule 4 Proposed Form.**—Cars shall be in such condition that the trucks can curve freely and the average clearance per side-bearing per truck must not exceed  $5/16$  in., and must not be less than  $1/8$  in.

**Rule 8.**—Add the following sentence to Paragraph (b): "For loads carried as single loads, overhanging one, or both ends, the weight limits shown in Rule 23 will govern."

This rule has been modified at the request of one of the large steel shippers to provide cross reference to Rule 23, because of Rule 8 requiring the weighing of the load in case of doubt, while Rule 23 sets forth specific allowable weights.

**Rule 12.**—Add the following sentence to Paragraph (a): "If the length of the material is such that it cannot be loaded without dropping the end gate, necessary blocking must be provided in order to clear end gate."

**Rule 13.**—Add, "Note 2. Shipments of long steel, which are liable to sag and take a permanent set due to this cause must have sufficient bearing-pieces applied to prevent sagging."

**Rule 21.**—Add the following sentence: "For method of securing operating mechanism of Rotary Types D and E couplers where coupler spacing blocks are required. See Figs. 3, 4 and 4-A."

**Rule 23—Proposed Form: Maximum Weight.**—Single Loads Overhanging One End or Both Ends of Car—In such loading the following weight limitations shall govern.

**Note 1:** Shipments of long steel, which are liable to sag and take a permanent set due to this cause, must have sufficient bearing-pieces applied to prevent sagging.

**Rule 24.**—Eliminate the note under this rule.

### Group II—Rules Governing the Loading of Structural Material, Plates, Billets, Castings, Wheels, Pipes, Etc.

**Rules 223, 224 and 224-A.**—[The committee recommends that the rules and figures be modified to take care of loading of light girders that may become damaged when loaded on more than one car. Also to correspond to more modern methods of loading. Figs. 58, 59 and 60 (not shown here) have been revised and an additional list of materials added, to correspond to the proposed changes in Rules 223, 224 and 224-A.—EDITOR].

**Rule 228.**—It is proposed to eliminate Note 1 from this rule

because it conflicts with Rule 30, which permits the loading of gondola cars.

**Rule 239—Proposed Form:** Paragraph 1. Rails, bar iron, channels, angles, etc., should, whenever possible, be loaded on single gondola cars. *If the length of material is such that it cannot be loaded without dropping the end gates, suitable blocking must be provided to clear the end gates.* If the length of material is such that it can be loaded inside of end gates, they must be raised and securely fastened. [The remainder of paragraph 1 is unchanged.—EDITOR].

**Rule 246.**—[The proposed form of this rule is worded to permit loading turntables on two or more cars, forming triple or quadruple loads as well as twin loads.—EDITOR].

**Rule 249.**—[The proposed form of this rule permits the loading of pipe from 24 in. to 30 in. in diameter, inclusive.

The number of stakes for loading the pipe at various heights above the car sides remains unchanged although the number used in each case is specified—"per pile." Explicit instructions as to methods of wiring, use of chock blocks, height of stakes, etc., is also given in the proposed form of the rule. It is recommended that Figs. 78 and 79 be eliminated because the requirements covered by them are now included in Fig. 80. The latter is modified and made to include pipe 24 in. to 30 in. in diameter, inclusive.—EDITOR].

**Rule 250.**—It is recommended that this rule be eliminated because all requirements are now included in Rule 249.

**Rule 250-A.**—[The Rule has been modified to state that "intermediate tie wires or bands shall be located on top of first tier above car sides" instead of "as close to the top of the car sides as practicable, but not over 18 in. above top of same," as the present rule reads. The proposed form also states that "additional intermediate tie wires or bands must be applied to stakes at not more than 30-in. intervals above the first intermediate tie wire or band" instead of 24-in. as stated in the present rule. Both proposed changes are to be included in both the third and fourth paragraphs. The rule was modified to provide a more suitable location for the intermediate wires.—EDITOR].

**Rule 250-B.**—This rule has been modified to include pipe 30 in. in diameter and to eliminate definite base line of lower tier in upper unit which has been found safe and practicable.

**Rule 251.**—[This rule has been modified to include pipe from 24 in. to 30 in. in diameter, inclusive, which has been found to be safe and practicable. Pipe 12 in. or less also included, thereby, eliminating Rule 258. The reference to Rule 249 for wiring and staking is replaced by complete instructions, in this rule. The use of Saplings is prohibited. Intermediate wire for loads over 3 ft. high has been found necessary and is included for safety.—EDITOR].

**Rule 251-A—Proposed Form:** Flat and Gondola Cars: Wrought iron pipe more than 30 in. in diameter must be loaded in accordance with Figs. 81-E, 81-E-I, 81-F, 81-G, 81-H and 81-I.

When loaded on flat cars as per Figs. 81-G, 81-H and 81-I, the side blocking must be backed up with 4-in. by 5-in. stakes fitted into stake pockets, and where possible must extend 14 in. above top of car floor. Where width of load will not permit this, the height of stakes must be sufficient to come in contact with pipe. Where diameter of pipe is such that blocking of sizes specified in Figs 81-G, 81-H and 81-I cannot be used, the blocks must be wedge shaped and side against stakes to be as high as possible.

Pipe loaded as per Fig. 81-G, must be secured with two rods  $3/8$  in. in diameter, or bands of equal strength, with threaded ends, may be substituted with two high tensile strength bands not less than 2 in. in width, or wires having a total ultimate tensile strength of not less than 7,200 lb.

Pipe loaded as per Fig. 81-H and 81-I, secured with three rods  $3/4$  in. in diameter, or bands of equal strength, with threaded ends, may be substituted with six high tensile strength bands not less than 2 in. in width, or wires having a total ultimate tensile strength of not less than 15,000 lb. Where intermediate cradle blocks are used and rivet holes are available, center tie rod or equivalent, may be omitted, in which case the ends of the pipe must be bolted together. Where more than four high tensile strength bands, or wires, are required per pile, the additional bands, or wires, must be used to tie piles into a unit.

The number of pieces of pipe in each tier and number of tiers, when loaded in accordance with Figs. 81-H and 81-I, shall be governed by the diameter of pipe.

When not loaded in pyramidal form each pipe must be placed directly in line with the one underneath.

[The next paragraph is the same as in present Rules.—EDITOR].

**Note:** Riveted pipe that may be damaged by coming in contact with each other must have filler pieces not less than 1 in.



by 4 in. of sufficient length, and placed so as to protect pipe from damage by rivet heads.

This rule was modified to more clearly define its intent.

**Rule 251-B—Proposed Form: Loading of Wrapped Pipe on Gondola Cars.** Fig. 80-C: For pipe less than 25 ft. in length, three pairs of stakes and three skids must be used. For pipe more than 25 ft. in length four pairs of stakes and four skids must be used. When height of load exceeds 3 ft. above car sides, one pair of stakes must be added. Stakes shall not be more than 5 ft. from ends of pipe, and intermediate stake, or stakes, shall be equally spaced between the two end stakes.

Hardwood, 2 in. by 6 in. skids No. 2, shall be about 3 in. shorter than inside width of car. Bands No. 1, shall consist of high tensile strength steel, not less than 2 in. wide, having an ultimate tensile strength of not less than 7,200 lb. They shall be lightly secured to bottom of skids with staples, and long enough to pass around the load so that ends will overlap on top of load.

Hardwood, 4 in. by 4-in. stakes No. 3 must extend from top of skids to top of load, and they shall be placed so that half of their thickness projects beyond the ends of skids. Band No. 1, must be secured to the outside of stakes with suitable metal straps No. 6, so as to permit free vertical movement of the former. Metal straps No. 9, shall be securely attached to outside of stakes and in line with angles on top of car sides, so constructed as to prevent the shearing of bands No. 1. Wrapped excelsior padding No. 4 shall be secured to inside faces of stakes with tie wires No. 5, and padding of baled excelsior must also be placed on top of skids. To keep stakes away from side of car and in proper position while loading, place block No. 8 between stake and side of car near top, and place block No. 7 at same location near bottom. These blocks should be removed after they have served their purpose so that load is relatively free to adjust itself without damage to wrapping on pipe.

After load has been finished, place sufficient excelsior padding on top of it to prevent damage to pipe wrapping, also cut off the stakes so that the inner sides of same are flush with top of load and beveled towards outer side to permit snug fitting of, and preventing sharp bends in bands. Band No. 1, shall then be placed over the pads on top of load, and they must be drawn equally taut with overlapping ends substantially sealed or welded together.

Note: All excelsior must be entirely enclosed with heavy wrapping paper.

It is recommended that the above rule be included in the Loading Rules to take care of a new condition in the shipment of pipe. Experimental shipments have proven this method safe and satisfactory.

It is recommended that Figs. 81-A, 81-C and 81-D, be eliminated from the Loading Rules because these methods of loading are now taken care of in Figs. 80, 81-G, 81-H and 81-I.

**Rule 255**—The marginal reference was modified as it should be confined to cast iron pipe.

**Rule 258**—It is recommended to eliminate this rule because all of its requirements are now taken care of in Rule 251.

### Group III—Rules Governing the Loading of Mining Cars, Engines, Boiler Shells, Machinery, Derricks and Similar Commodities

**Rule 302**—This rule was modified at the request of one of the large tank shippers to define more clearly when end blocking was to be applied. This was done by separating paragraph three into two paragraphs and adding a definite statement to cover all tanks over eight feet in diameter.

**Rule 304**—[It is recommended that the heading to this rule read: "Loading of Engines, Tractors, Compressors and Similar Machines, on their own wheels, also Tractors, Wagons, Etc., of the Crawler Type." Also that general Rule No. 6 be added, which must be observed in addition to the ones specified in the first paragraph of the present rule. This modification is recommended on account of the heavy blocking provided for in Figs. 102 and 103 not being required on tractors, etc.—EDITOR.]

**Rule 305**—[It is recommended that the following sentence be inserted as the second sentence of the rule: "Compressors weighing over 8,000 lb. may be loaded as per Fig. 105 and combined harvesters must be loaded as per Fig. 105-F." This sentence is added to clarify the methods of loading compressors and combined harvesters.—EDITOR.]

**Rule 305-A**—[It is recommended that the phrase "weighing 25,000 lb. or less" be inserted in the first sentence of the rule, specifying the weight of tractors, wagons and similar machines to clarify the rule. It has been recommended to modify the bracing requirements at the rear of the machines shown in Fig. 103-A to provide a bearing piece between the uprights and floor of the car. It is proposed to change the headings

to Figs. 104, 105, 105-A, 105-B, 105-C, 105-D, 105-E to state that the equipment shown shall be loaded lengthwise on the cars. The wording of Figs. 104 and 105 to coincide with changes in Rules 304 and 305 and the wording of the others to coincide with changes in Rule 305 only. Fig. 105-F is added, new, to take care of loading combined harvesters weighing over 8,000 lb. The word "Engines" has been left out of the heading to Figs. 106 and 106-A to coincide with the change in Rule 305. None of the figures mentioned are included here.—EDITOR.]

**Rule 306**—The second sentence of Section (e), second paragraph, is changed to read: *Alternate methods may be used by securing the body portion to the crawler structure with two anchors at front and two anchors at rear, or two anchors at outer end of boom, direct to car body, and two anchors at rear of body portion to crawler structure. When these alternatives are used, the machine must be secured to the car with cables or rods of sufficient strength to prevent excess vertical motion, except when loaded as per Fig. 103-C.*

This rule has been modified to take care of alternate methods of loading.

As an additional safety measure the following sentence is added to the note at the end of Rule 306: "Propelling mechanism must be thrown out of gear and secured in that position, or disconnected."

### Group IV—Rules Governing the Loading of Concrete Culvert Pipe, Brick, Stone, Building Tile and Similar Products

**Rules 406, 407 and 408**—[As an additional safety measure, in all three of these rules, where mention is made of two stakes being used for securing the load, it is proposed to make them read: "... and two pairs of side stakes must be used per pile 10 ft. or less in length, and three pairs of stakes must be used per pile exceeding 10 ft. in length, in addition, etc." The remaining parts of all these rules with the exception of the above italicized portion, remains unchanged.—EDITOR.]

The report was signed by Samuel Lynn (chairman), superintendent rolling stock, P. & L. E.; R. H. Dyer, general car inspector, N. & W.; E. J. Robertson, superintendent car department, M. St. P. & Sault Ste. Marie; G. R. Lovejoy, master mechanic, Detroit Terminal Railway; T. O. Sechrist, assistant superintendent Machinery, L. & N.; C. J. Nelson, chief inspector, Chicago Car Interchange Bureau; R. B. Rashbridge, superintendent car department, Reading; W. B. Moir, chief car inspector, Pennsylvania; J. A. Deppe, assistant superintendent car department, C. M. St. P. & P.

Action.—The report was accepted and referred to letter ballot.

## Lubrication of Cars and Locomotives

In its 1931 report the Committee on Lubrication of Cars and Locomotives urged that serious attention be given to eliminating the use of inferior grades of oil, which at low temperatures will congeal and cause packing to roll, thus causing a hot box. The report called attention to tests which were now being conducted by a number of oil companies to determine satisfactory grades of car oil. During the coming year the committee expects to complete tests to determine the quality of waste best adapted for feeding oil to the journal and holding oil in suspension. Extensive tests are now in progress to determine whether it is practical to discontinue the use of the back roll.

The committee proposed the following definition of a hot box for adoption as recommended practice: "An overheated journal (commonly known as a hot box) is one that requires treatment or setting out of any car when such hot journal develops between originating point and point of destination of the car on carrying road, irrespective of class of train or point at which car is set out."

The report also contains a method for analysis of reclaimed waste and a journal-bearing-wedge condemning gage. It stated that there were still a number of railroads and private lines using inferior materials in packing of car-journal boxes, and were stenciling the cars to indicate that the box packing had been properly done.

The recommendations for reporting hot boxes, method for analysis of reclaimed waste and the journal-bearing-wedge condemning gage were proposed by the committee for adoption by letter ballot.

That part of the report pertaining to lubrication of locomotives showed progress in the work of the committee to

secure further improvements in locomotive lubrication. The use of  $\frac{3}{16}$ -in. perforations in perforated plates, instead of  $\frac{1}{8}$ -in. proved satisfactory in warm climates but not altogether successful at temperatures below freezing. Service tests extending over a period of approximately 18 months on one road, where it is necessary to provide against extreme summer and winter temperatures, have shown that perforated plates with  $\frac{3}{16}$ -in. perforations and follower plates with a spring tension of 75 lb. maximum and 70 lb. minimum at 1-in. height, provide a happy medium. Further tests of split driving-box brasses shown in the 1930 report of the committee reflect improved performance in reducing running temperatures and consequent reduction in the consumption of driving-journal compound on heavy power in fast service. A service test of mechanical lubrication of driving hubs, making use of heavy oil forced to the hubs with a mechanical force-feed lubricator showed good results. A heavy freight locomotive showed less than  $\frac{7}{16}$ -in. wear on the hub liners after 40,000 miles.

A considerable portion of the report was devoted to engine-truck journal lubrication in connection with floating engine-truck bearings. Reports received by the committee show that mechanical force-feed lubrication has effected a substantial improvement in a reduction of the number of hot bearings. The committee also reported good performance of engine-truck and trailer hub lubrication with floating hub liners and grease applied under pressure through the hubs on engine trucks and through the box on the trailing trucks. The committee concluded its report with the statement that the pressure grease system of lubrication is gaining rapidly in favor and that a large majority of the locomotives built during the past year have been equipped with this system.

The report was signed by G. W. Ditmore (chairman) master car builder, D. & H.; H. W. Johnson, superintendent of motive power and rolling stock, M. & St. L.; P. Maddox, superintendent car department, C. & O.; T. O. Sechrist, assistant superintendent of machinery, L. & N.; A. J. Harner, lubrication engineer, U. P.; M. J. O'Connor, mechanical inspector, N. Y. C.; E. Von Bergen, general air brake, lubrication and car-heating engineer, I. C.; I. T. Burney, lubrication engineer, B. & M.; E. C. Cromwell, lubrication supervisor, B. & O.

**Discussion.**—The desirability of an A. R. A. gage to check distorted wedges when taken back in the shop and reset was emphasized, and Chairman Ditmore said that the committee would proceed with the development of such a gage during the coming year. A member stated that the most important work of the committee would be the development of specifications for a single oil which would meet both summer and winter conditions satisfactorily; that good results are already being secured along this line, and that further study and progress should be made.

The extension of the period for repacking car journals on the repair tracks from nine months to 12 or more was suggested, the consensus being that such extensions should not be granted in the case of journal-box packing unless also granted for air-brake cleaning, in order that both of these operations can be performed at the same time. The question of extension of the time for periodic repacking of journal boxes and cleaning of air brakes was referred jointly to the Lubrication and the Brake Committees for a thorough study of all the various factors involved, and the development of recommendations to be submitted at next year's convention. The Lubrications Committee was also asked to amplify its definition of a hot box in order to make all details clear and generally understood.

The report was accepted and the recommendations referred to letter ballot.

## Report on Couplers and Draft Gears

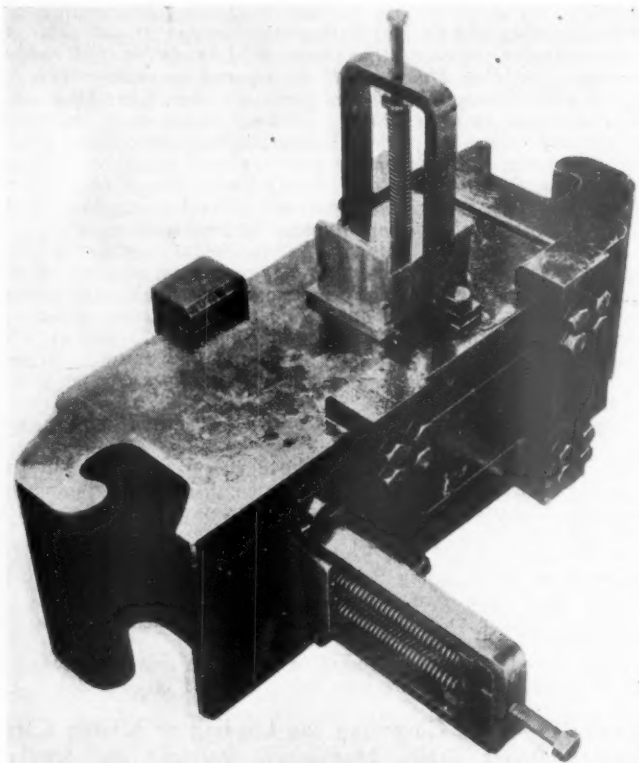
The Committee on Couplers and Draft Gears reported satisfactory results from its study of the operation of the Type-E coupler, and recommend that it be advanced from recommended practice to standard. It is recommended, however, that the Type-D coupler remain as a standard until the Type-E is generally introduced.

A number of designs of uncoupling rigging with the Type-E coupler were submitted by several manufacturers for tests. It was recommended that a type of rigging submitted by the McConway & Torley Company and a second type submitted by the National Malleable & Steel Castings Company be submitted to letter ballot for adoption as recommended practice.

During the year the committee observed the performance of rigid-shank couplers with horizontal attachments; Symington swivel-butt couplers with horizontal attachments, and rigid-

shank couplers with vertical cast-steel swivel yokes. With the object of facilitating interchangeability of parts in couplers with swiveling features, the coupler manufacturers have agreed on the manufacture of one type of swivel-butt coupler; namely, the Symington design, which all are privileged to manufacture. This action on the part of the coupler manufacturers made it necessary to develop comparative data as to the strength of the parts involved. Static tests were made in the laboratories of the Buckeye Steel Castings Company and the National Malleable & Steel Castings Company, under the supervision of the committee, of the Type-E coupler,  $\frac{6}{8}$ -in. by 8-in. rigid shank; Type-E coupler,  $\frac{6}{8}$ -in. by 8-in. swivel shank; A. R. A. vertical-plane cast steel yoke; A. R. A. vertical-plane cast-steel swivel yoke; Type-E coupler,  $\frac{6}{8}$ -in. by 8-in. rigid shank and vertical-plane cast-steel yokes, and Type-E coupler,  $\frac{6}{8}$ -in. by 8-in. swivel shank and vertical-plane cast-steel swivel yoke. The report contained a number of sketches showing certain detail changes which will have to be provided in the car construction to accommodate the vertical-plane swivel yoke.

**Report of Sub-Committee on Draft Gears.**—The Sub-Committee on Draft Gears continued its car impact tests during the year and the conclusion was reached that, in order to



Ball-Impression Dynamometer Designed and Built by the Pennsylvania to Measure the Force Acting Between Two Cars

determine the maximum permissible recoil, it will be necessary to conduct road tests. These tests will be made as soon as possible. The sub-committee recommended that Section 11 of the specifications be changed to read as follows:

**"Recoil.**—A minimum percentage of recoil, consistent with freedom from sticking, is desirable. The recoil shall be measured and reported for each type of car tested, but this shall be only for the information of the purchaser and no car shall be rejected solely on account of high recoil until a definite limit is set."

This recommendation, together with supplementary-purchase specifications for improved draft gears for freight service, were recommended for submission to letter ballot for approval as standard.

The report concluded with recommendations that further tests of trains equipped with standard gears, selective-travel, the Alma gear and the Duryea car-cushioning device, be continued by the A. R. A. It also recommended to the manufacturers that attention be given to a solution of the difficulty of applying many types of draft gears owing to the necessity of compressing the friction elements in order to insert the gear in the standard pocket.

The report of the sub-committee on rigid-shank and swivel-butt couplers was presented by H. W. Coddington (chairman),



and the report of the sub-committee on draft gears by H. W. Faus (chairman), engineer of tests, N. Y. C. The report of the main committee was signed by R. L. Kleine (chairman), assistant chief of motive power, Penna.; C. P. Van Gundy, engineer of tests, B. & O.; C. J. Scudder, superintendent of motive power and equipment, D. L. & W.; H. W. Coddington, engineer of tests, N. & W.; C. B. Young, general mechanical engineer, C. B. & Q.; Samuel Lynn, superintendent of rolling stock, P. & L. E.; J. P. Michael, chief mechanical engineer, C. & N. W., and C. T. Ripley, chief mechanical engineer, A. T. & S. F.

**Discussion.**—In answer to a question as to the advisability of advancing the type-E coupler from recommended practice to standard with a relatively limited amount of service experience, Chairman Kleine pointed out that the type-D coupler, since it was first applied in 1914, has been subjected to a constant process of improvement in detail not affecting the interchangeability of the parts, and that the type-E represents the result of this same process of evolution, affecting interchangeability with the parts of the type-D, and that the experience with these couplers throughout this period of development leaves no reason to expect that the type-E will not remain a standard for some time to come.

A question was raised as to the necessity for the cross key in the design of swivel-butt coupler with vertical-plane yoke with the use of a separate carrier iron, and it was asked if it would be a permissible alternate to leave out the cross key. Chairman Kleine promised that the committee would take this matter under consideration.

In connection with the preparation of the report on the draft-gear recoil tests, motion pictures were shown illustrating the recoil actions of cars equipped with draft gears of varying percentages of recoil when coupled at varying speeds.

The report was accepted and submitted to letter ballot as recommended by the committee.

## Joint Committee On Reclamation

The report of the Joint Committee on Reclamation stated that the committee had given further study to the reclamation of truss type brake beams, autogenous welding of couplers and building up worn collars of car axles by autogenous welding. An abstract of this report was published in the May 23, 1931, issue of the *Railway Age*, page 1027, in the report

of the annual convention of the Purchases and Stores Division.

The report is signed by J. C. Bon (chairman), superintendent of reclamation, Wabash; G. W. Lieber, superintendent of reclamation, M-K-T; A. L. Prentice, supervisor of scrap and reclamation, N. Y. C.; W. P. Stewart, superintendent of scrap, I. C.; J. W. Bukey, Foreman reclamation plant, Penna., and L. R. Wink, assistant superintendent, car department, C. & N. W.

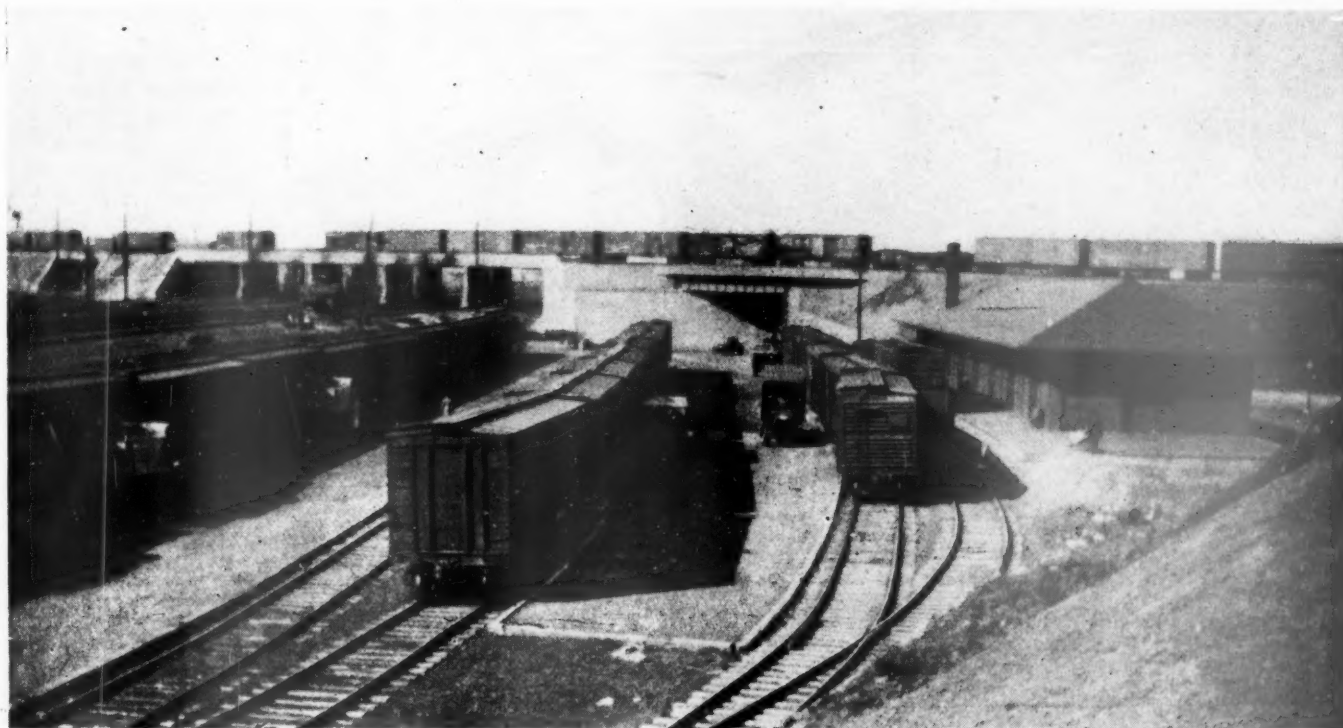
**Action.**—The report was accepted.

## The New Officers

Owing to the resignation of A. R. Ayers, general manager of the New York, Chicago & St. Louis, as chairman of the Mechanical Division, it became necessary to elect a chairman to serve the remainder of Mr. Ayers' term. On the proposal of the Nominating Committee, O. S. Jackson, general superintendent motive power and machinery, Union Pacific System, was elected chairman, and Silas Zwight, general mechanical superintendent, Northern Pacific, vice-chairman, to replace Mr. Jackson, both to serve until June, 1932. The six members of the general committee whose terms expired were re-elected to serve until June, 1933. These were J. S. Lentz, consulting master car builder, Lehigh Valley; J. A. Power, superintendent motive power and machinery, Southern Pacific, Texas and Louisiana Lines; F. H. Hardin, assistant to president, New York Central; A. G. Trumbull, chief mechanical engineer, Chesapeake & Ohio; G. E. Smart, chief of car equipment, Canadian National, and G. A. Moriarty, general mechanical superintendent, New York, New Haven & Hartford. Mr. Ayers was elected to fill the vacancy created by the election of Mr. Zwight to the position of vice-chairman.

In addition to the reports here summarized or abstracted, a brief report was presented by the Committee on Utilization of Locomotives and Conservation of Fuel. This consisted of a summary comparison of operating statistics of 1929 and 1930.

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Illinois Central Freight Station, Grand Crossing, Ill.—New York Central and Pennsylvania Tracks Overhead

# Motor Transport Section

## Reading Motor Coaches Save 391,000 Train Miles

Saving of \$409,000 in 1930 from replacement of train service—Intercity  
and feeder routes also operated by transportation company

**W**ITH the greater part of its mileage made up of short branch lines, the Reading was a natural target for highway competition from the beginning of the popularity of automobile and motor coach travel. The major part of its system being within a radius of less than 100 miles from Philadelphia, the average haul per passenger on the Reading is quite short. Declining patronage of branch line trains was the natural result of increasing highway competition, and the railroad was faced with the problem of reducing the losses incurred in the operation of lightly-patronized trains.

Although it desired to eliminate these trains, the management felt that it could not make further reductions in train service without affecting adversely the prestige of the railroad in the area which it had served for a century. The trains were not well patronized and they were

losing money, but the management did not want to take them off because, in most cases, the only way that money could be saved was by the elimination of a train crew. This would have resulted in the elimination also of all or most of the train service, and would have left the communities tributary to the Reading with little or no transportation service.

The Reading was attracted to motor coach operation by the cheapness of such service, the estimated motor coach operating cost of 25 to 30 cents per mile comparing very favorably with the expense of \$1.00 to \$1.25 per mile, representing the out-of-pocket cost of passenger train operation. Motor coaches, furthermore, offered not only a means of reducing the expenses of operation to a point considerably nearer the available revenues, but also would enable the continuation of adequate service. Accordingly, in April, 1928, the Reading



At the Reading Railway Station in Reading, Pa.—A. C. Tosh, Superintendent of the Reading Transportation Company, Third from Left





A New York-Philadelphia Coach, Operated by the Reading Transportation Company and the Jersey Central Transportation Company

Transportation Company was organized, equipment was purchased, and several motor coach runs, replacing train service, were established.

#### Lines Extended Steadily

The growth of the motor coach operating system of the transportation company has been steady since its inception. At the close of 1929, 592.6 miles of motor coach routes were operated. In 1930, 256.3 additional miles of routes were established, bringing the total route mileage, in operation at the end of 1930, up to 828.9 miles. At the close of 1930, the transportation company had 77 motor coaches in operation, and during last year carried 1,248,144 passengers.

The most substantial profit which the transportation company is earning for the railway lies in the savings which it makes possible through the elimination of passenger train service. It is believed, moreover that much of this passenger service would have had to be continued if substitution of motor coach service for train service had not been carried out. During 1930, the transportation company operated 11 routes on which motor coaches were provided in substitution for train service. The operating expenses involved in the pro-

vision of this train-substitution service amounted in 1930 to \$167,000. It is estimated, however, that the savings of the railway in 1930, through the withdrawal of the steam passenger trains, amounted to approximately \$409,000. The net saving would doubtless have been greater if it had not been for the fact that the policy of the Reading, in substituting motor coaches for trains, is to provide more schedules rather than less. The Reading saved approximately 391,000 steam train miles in 1930, but the additional schedules of the train-substitution motor coaches brought the motor coach mileage on the train replacement lines up to approximately 607,000 miles.

#### Increased Service Offered

The bus lines operated in substitution for train service are shown in the following table:

Route	Route Miles
Jenkintown-New Hope .....	24.0
Lansdale-Doylestown .....	12.0
Pottstown-Barto .....	13.3
Doylestown-Langhorne .....	21.4
Pottsville-Shenandoah .....	12.0
Pottsville-Lykens .....	30.7
Milton-West Milton .....	1.2
Mt. Carmel-Mt. Carmel Junction .....	2.0
Carlisle-Shippensburg .....	22.7
Carlisle-Gettysburg .....	29.9
Lebanon-Pine Grove .....	26.0

Smaller Equipment Is Operated on Short Train - Replacement Routes

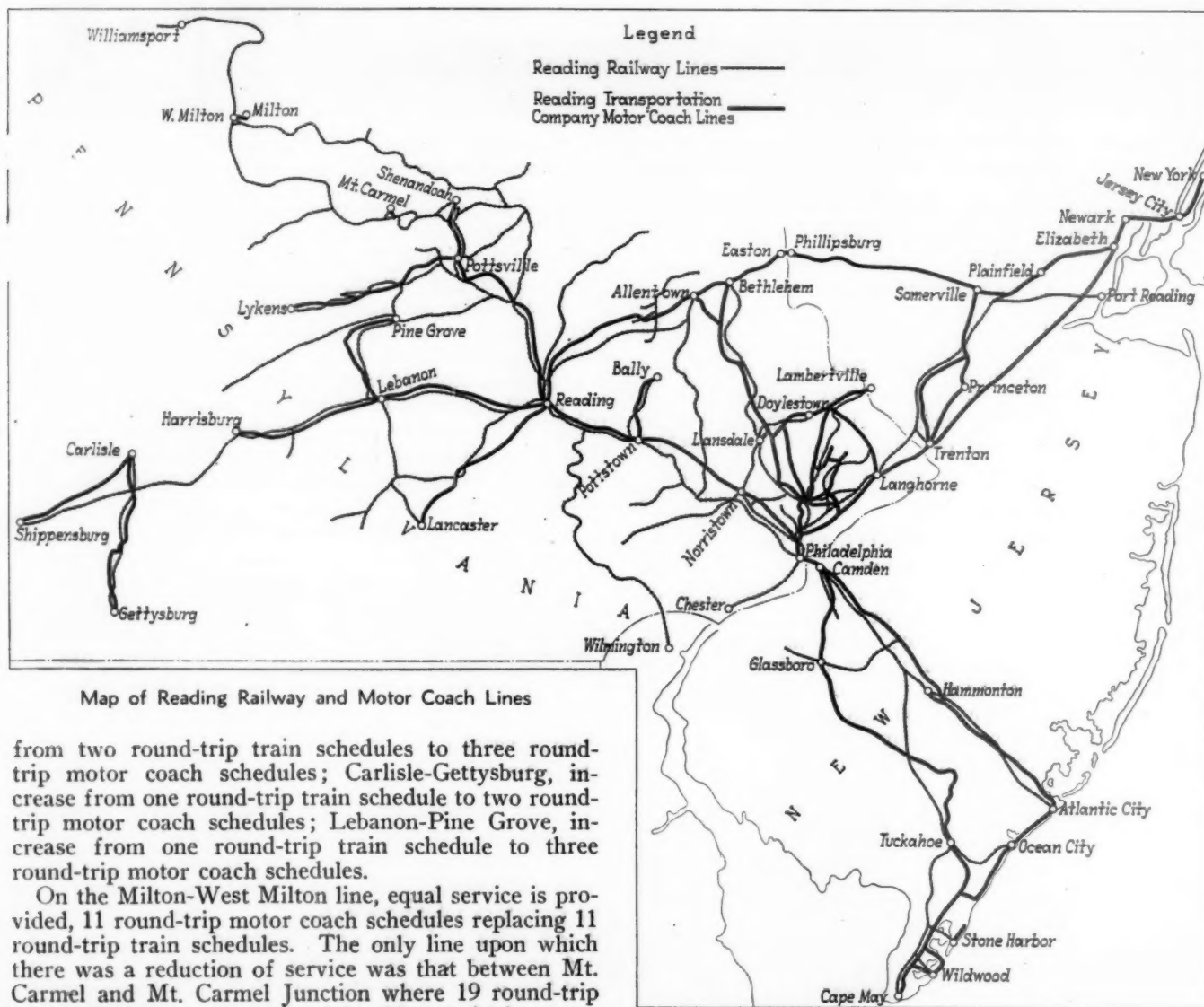


On the Jenkintown-New Hope route, six motor coach round-trips, operated on week days, have replaced four round-trip train schedules. On the Lansdale-Doylestown route, 11 round-trip motor coach schedules have replaced seven round-trip train schedules. Comparisons of the former train service with the existing motor coach service show more frequent schedules on the other lines as follows: Pottstown-Barto, increase from one round-trip train schedule to three round-trip motor coach schedules; Doylestown-Langhorne, increase from four round-trip train schedules to seven round-trip motor coach schedules; Pottsville-Shenandoah, increase from three round-trip train schedules to eight round-trip motor coach schedules; Pottsville-Lykens, increase from two round-trip train schedules to five round-trip motor coach schedules; Carlisle-Shippensburg, increase

portation company operates five suburban feeder bus routes. All of these are in the vicinity of Philadelphia. The purpose of these feeder lines is to extend Reading service by co-ordinated train and motor coach schedules to localities which previously had been served to some extent by train service alone.

The suburban feeder lines, with their lengths and number of round-trip schedules operated on week days, are as follows: Jenkintown-Richboro, 12.9 miles, four round trips; Jenkintown-Chalfont, 16.0 miles, two round trips; Fox Chase-North Glenside, 8.0 miles, 23 round trips; Willow-Grove-Southampton, 8.9 miles, three round trips; Fox Chase-Richboro, 11.9 miles, five round trips.

In addition to the five round trips between Fox Chase and Richboro, 10 additional round trips are operated



Map of Reading Railway and Motor Coach Lines

from two round-trip train schedules to three round-trip motor coach schedules; Carlisle-Gettysburg, increase from one round-trip train schedule to two round-trip motor coach schedules; Lebanon-Pine Grove, increase from one round-trip train schedule to three round-trip motor coach schedules.

On the Milton-West Milton line, equal service is provided, 11 round-trip motor coach schedules replacing 11 round-trip train schedules. The only line upon which there was a reduction of service was that between Mt. Carmel and Mt. Carmel Junction where 19 round-trip train schedules were replaced by 14 round-trip motor coach schedules. These two last lines, upon which additional service was not provided in connection with the motor bus substitution, are both two miles or less in length. In addition to the schedules shown, some limited service is also operated between intermediate points on the Jenkintown-New Hope, Lansdale-Doylestown, Pottstown-Barto, Doylestown-Langhorne and Carlisle-Gettysburg routes. The schedules shown represent week-day operations, there being somewhat less frequent service on Sunday.

In addition to its train-replacement lines, the trans-

between Fox Chase and Bryn Athyn, and 13 round trips between Fox Chase and Southampton.

#### Intercity Lines

Following the establishment of the train-replacement motor coach routes, the transportation company next turned its attention to the operation of bus lines between the more important cities served by the Reading. At the present time it has 11 intercity lines operating between points which originate a relatively heavy vol-

(Continued on page 1259)



# Fast Service To Meet Competition

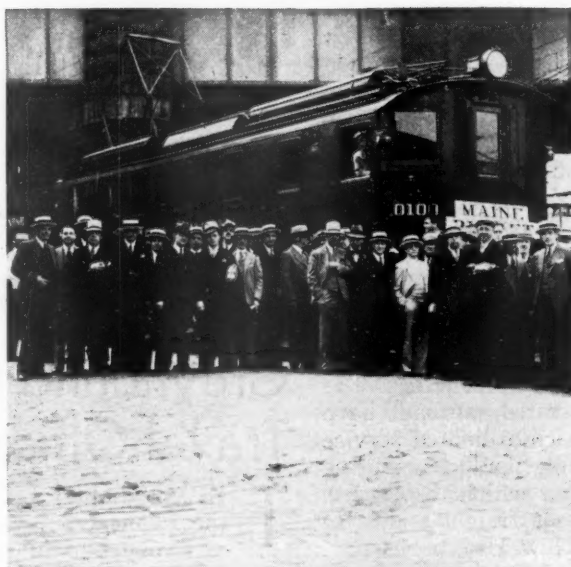
Motor trucks co-ordinated with "Maine Bullet," new B. & M.—

New Haven freight train, speed operations at  
500 New England points

**C**O-ORDINATED rail and highway operations which offer to New England and New York City railway patrons an overnight freight service, the convenience of which, railroad officers believe, "is not even approached by any other means of merchandise transportation," was inaugurated on June 15 with the joint operation by the New York, New Haven & Hartford and the Boston & Maine of a new fast freight train—the "Maine Bullet"—between New York and Portland, Me. The new train operates between New York and Portland, about 340 miles, on a 13¼-hour schedule, and in the opposite direction on a 12¼-hour schedule; it thus reduces by 24 hours (and more in some cases) the time in transit of freight moving between New York and New England and also between points in Northern New England and points in Southern New England.

New Haven and Boston & Maine officers anticipate that the speeded service will be an effective means of meeting highway and steamboat competition. Interest in the new train is especially keen, and assurances of patronage are already being received from shippers who have been employing other agencies of transportation.

The direct runs of the train between New York and Portland, however, are but the nucleus around which is built a co-ordinated transportation plan to serve some 500 communities in New England. Motor trucks of the



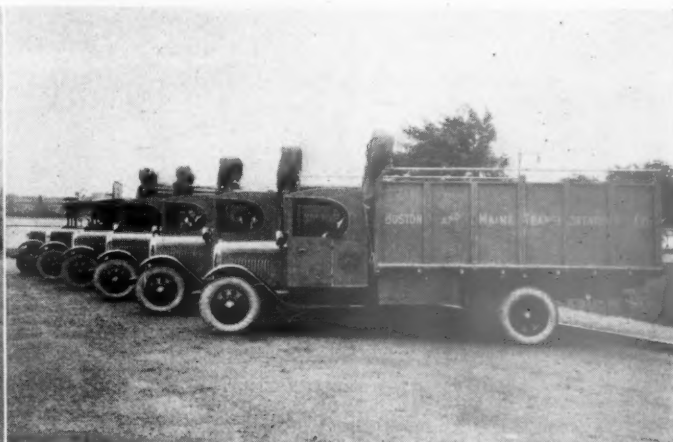
The "Maine Bullet" Ready To Leave New York on its Inaugural Run

New England Transportation Company and of the Boston & Maine Transportation Company, highway subsidiaries respectively of the New York, New Haven & Hartford and of the Boston & Maine, co-ordinating with the Maine Bullet, operate in territories surrounding designated concentration points on the lines of the two railroads. Cars are added to or cut out of the Maine Bullet at such of these concentration points as are located along its route, while cars loaded at or destined to off-route concentration points are switched at strategic junctions. The trucking service is at present a station-to-station movement, with no store-door collection or delivery involved.

There are 17 concentration points, two being located at

Boston, Mass.—one to serve patrons of the New Haven, and the other on the Boston & Maine. Trucks of the New England Transportation Company serve 61 stations surrounding the New Haven's Boston concentration center, while the trucks of the Boston & Maine Transportation Company operate between that road's Boston concentration point and 50 outlying stations. Cars from these Boston concentration points are forwarded to Lowell, Mass., where they join the Maine Bullet. Likewise, in the return direction, Boston cars are set off at Lowell.

Connection is also made at Lowell to and from the Concord, N. H., concentration point of the Boston & Maine, and to and from the Fall River and New Bed-



Motor Trucks of the New England Transportation Company (left) and of the Boston & Maine Transportation Company

ford, Mass., concentration points of the New Haven. Out of Concord, the B. & M. trucks serve 16 New Hampshire points, while the New England trucks at Fall River and New Bedford serve respectively 15 and 22 outlying stations.

Other concentration points located off the route of the Maine Bullet are those at Providence, R. I., and Waterbury, Conn. Cars to and from Providence connect with the train at Worcester, Mass., while those to and from Waterbury make connections at Hartford, Conn. Providence serves as the concentration point for a greater number of stations than does any of the other centers, if the Boston concentration stations of the two railroads be considered separately. From Providence motor trucks operate to 82 stations in surrounding territory. There are seven stations served by trucks operating around Waterbury.

Other large concentration points—all located along the route of the train—are: Bridgeport, Conn., with trucks serving 39 stations; New Haven, Conn., with trucking service to 41 points; Hartford, with trucks serving 47 points; Putnam, Conn., with trucking service to 27 outlying communities; Lowell, with trucks serving 26 Massachusetts stations; and Lawrence, Mass., with trucking service to 36 outlying stations. Minor concentration points are Nashua, N. H., and Manchester.

It will be seen that the two interested railroads have evolved around the Maine Bullet a co-ordinated service touching every important producing and distributing point in the New England territories which they serve. The Maine Bullet is the second fast freight train, inaugurated recently, in which the New Haven has participated. On April 27 there was placed in service the "Speed Witch" operated in conjunction with the Pennsylvania between Boston and Baltimore, Md. The popularity of this latter train thus far indicates that it is attracting merchandise traffic which formerly moved by highway and water.

The inaugural of the Maine Bullet on June 15 was attended by appropriate ceremonies in New York and Portland. Civic and business leaders of the Bronx, New York, participated with railway officers in the despatch of the eastbound train from the New Haven's Harlem River (N. Y.) yards. Likewise, at Portland, a dedication of the westbound train was held, while similar ceremonies greeted the trains at the larger cities along the route.



The Travel Office Is Located in the Union Trust Building, Cleveland

## Greyhound Lines Open Travel Office in Cleveland

THE Greyhound Lines, affiliated in the East with the Pennsylvania, on June 1 opened a new travel and tour bureau in the Union Trust building at Cleveland, Ohio. The advertising program of the Greyhound Lines, which is an outstanding part of this motor coach system's campaign for new passengers, was described in the *Railway Age* of May 23. The new travel and tour bureau at Cleveland is indirectly a result of this advertising program.

A travel bureau, the first organized by any motor bus company in this country, was established in 1928, with a staff of two members. The rapid expansion of the Greyhound Lines, together with the large increase in newspaper and magazine advertising, brought a steadily larger number of inquiries so that additional employees were added to the staff from time to time. More than 125 letters a day are now received and answered by the travel and tour department.



Interior of the Travel Office



The department is supplied with the tariffs and schedules of every motor bus line in the country. The five employees now engaged in the department are qualified to give full information as to routes, rates and points of interest. To keep them in touch with current travel conditions, each of these employees makes a periodical trip to various parts of the country.

According to L. D. Koller, general traffic manager, the direct ticket sales made in the bureau are expected to pay for its maintenance within a short time. Miss A. J. Houle is the manager of the travel and tour department, in direct charge of the bureau.

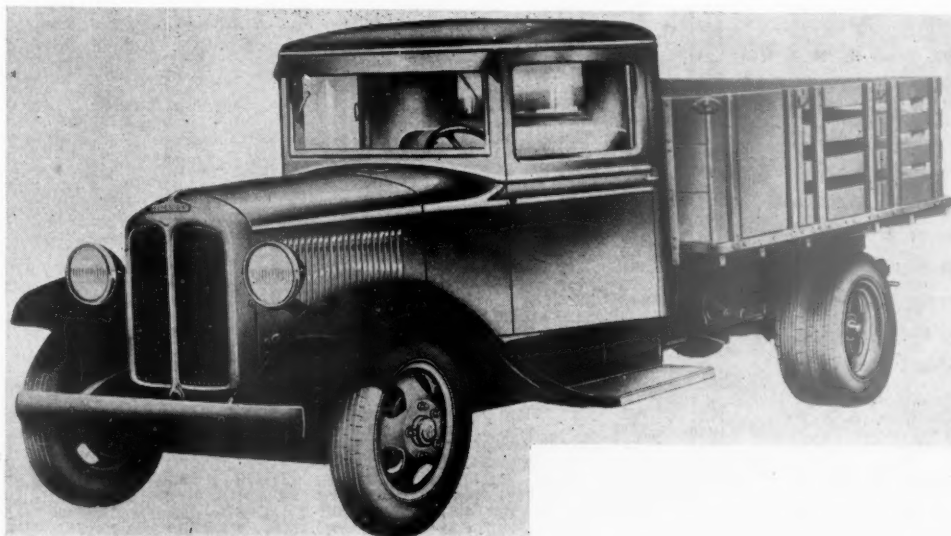
## Reo Announces Two New "Speed-Wagons"

TWO new "Speed-wagons," one with a four-cylinder engine and the other with a six-cylinder engine, and both with a wheelbase of 136 in., and a capacity of 1½ tons, have been placed on the market by the Reo Motor Car Company, Lansing, Mich. A 160-in. wheelbase chassis is also available. The engines are said to have the largest displacement of any in similarly low-priced 1½-ton trucks. The four-cylinder engine has a crankshaft 3 in. in diameter, supported by five bearings. The crankshaft in the six-cylinder model is supported by seven bearings. Both engines have full pressure lubrication with drilled oil passages in the crankcase and drilled connecting rods to admit oil under pressure to the hollow piston pins. The power is transmitted through a 10-in. single dry plate clutch and a four-speed heavy-duty transmission to the full-floating rear axle.

The standard 136-in. wheelbase model has a frame length of 102½ in. behind the cab. The distance from the back of the cab to the center of the rear axle is 60½ in. The corresponding dimensions of the 160-in. wheelbase model are 126½ and 84½ in. The frames are 34 in. wide, of straight channel section with a depth of 7 in. and a flange width of 2¾ in. The frames are reinforced by five cross members.

Both trucks are provided with enclosed four-wheel, internal-expanding hydraulic brakes, with 15-in. by 2¼-in. shoes in the rear wheel brakes and 14-in. by 1¾-in. shoes in the front wheel brakes.

The New Six-Cylinder 1½-Ton Reo "Speed-Wagon"



## Reading Motor Coaches Save 391,000 Train Miles

(Continued from page 1256)

ume of traffic. These intercity lines are shown in the following table:

INTERCITY BUS LINES		
Route	Route Miles	Round Trips Weekdays
Philadelphia-Reading-Pottsville .....	90.9	3
Harrisburg-Reading-New York .....	184.6	5
Reading-Lancaster .....	32.9	2
Atlantic City-Ocean City .....	11.0	8
Atlantic City-Wildwood .....	45.0	8
Wildwood-Cape May .....	14.7	14
Philadelphia-Atlantic City .....	62.0	15
Wildwood-Avalon .....	20.0	7
Philadelphia-Wildwood .....	89.4	3
Philadelphia-New York .....	102.7	15
Philadelphia-Allentown .....	58.8	4

In addition to the three round trips on the Philadelphia-Reading-Pottsville line, some additional service is operated between intermediate points. Summer service is represented in the schedules shown on the Atlantic City-Ocean City, Atlantic City-Wildwood, Wildwood-Cape May, Philadelphia-Atlantic City, Wildwood-Avalon, and Philadelphia-Wildwood routes. This service is greatly curtailed during the winter months. On the intercity lines, approximately the same service is offered on Sundays as on weekdays.

The Harrisburg-Reading-New York line and the Philadelphia-New York line represent a joint enterprise of the Reading and the Central of New Jersey, the motor coach service being carried on by the Reading Transportation Company and the Jersey Central Transportation Company.

### Operating Costs

The operating cost per motor coach mile during 1930 was \$0.2432. The total operating expenses for the 2,855,444 motor coach miles operated, including all schedules and special trips, were \$694,448.79 in 1930. The various items of expense, including total expense and expense per mile, are shown in the following tabulation:

	Expense per Annum	Expense per Mile
Maintenance of plant and equipment, including deferred maintenance and tire rental.....	\$135,807.91	\$.0475
Depreciation .....	115,464.15	.0404
Traffic .....	22,461.15	.0079
Transportation .....	200,379.99	.0702
Gasoline .....	108,329.79	.0379
Oil .....	9,060.15	.0032
General Administrative .....	13,315.96	.0047
Taxes and Licenses .....	21,872.65	.0077
Insurance .....	67,085.02	.0235
Miscellaneous .....	672.02	.0002
	\$694,448.79	\$.2432

## Operating Statistics of Large Steam Railways—Selected Items for the Month of April, 1931,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles		Car-miles		Ton-miles (thousands)		Average number of locomotives on line				
			Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross. Excluding locomotives and tenders	Net. Revenue and non-revenue	Service-able	Un-serv-iceable	Per cent unserv-iceable	Stored	
New England Region:													
Boston & Albany.....	1931	407	143,211	149,494	12,382	4,024	65.8	210,867	70,400	84	46	35.1	27
	1930	407	179,732	190,481	19,028	4,550	65.5	236,411	82,472	101	22	17.6	40
Boston & Maine.....	1931	2,066	316,811	364,766	38,149	11,430	68.7	599,166	220,433	228	74	24.5	49
	1930	2,066	361,944	414,847	55,862	12,549	70.2	656,758	237,834	239	56	18.8	61
N. Y., New H. & Hart.....	1931	2,094	393,099	460,540	23,868	13,852	64.6	751,202	277,689	258	86	25.1	32
	1930	2,104	433,449	503,206	30,933	15,139	64.2	814,686	298,738	283	61	17.8	46
Great Lakes Region:													
Delaware & Hudson.....	1931	876	268,363	356,808	38,998	9,029	61.8	553,204	249,449	248	23	8.5	123
	1930	875	289,654	392,164	48,602	9,978	64.0	596,459	272,234	244	27	10.0	105
Del., Lack. & Western....	1931	998	417,494	462,196	51,299	14,129	66.2	799,962	320,412	215	59	21.7	30
	1930	998	454,244	502,160	56,178	15,610	66.4	878,182	348,553	237	56	19.0	37
Erie (inc. Chi. & Erie)....	1931	2,316	716,572	750,628	65,670	31,982	61.0	1,923,213	723,272	385	94	19.7	109
	1930	2,316	799,126	859,425	59,825	35,272	61.7	2,087,313	804,174	406	96	19.1	95
Grand Trunk Western.....	1931	1,019	244,059	246,783	2,433	7,126	62.2	408,806	145,534	115	35	23.5	39
	1930	1,020	297,864	301,348	3,212	8,881	66.5	482,113	177,348	115	36	23.9	24
Lehigh Valley .....	1931	1,343	430,355	458,878	45,578	14,201	64.3	856,865	358,121	221	121	35.4	35
	1930	1,343	475,265	516,241	57,791	14,859	65.1	864,881	355,733	259	85	24.9	31
Michigan Central.....	1931	1,869	429,116	431,031	10,062	14,449	60.6	817,987	261,919	152	63	29.1	43
	1930	1,865	504,700	506,614	14,481	17,164	59.7	967,224	319,587	168	53	24.0	36
New York Central.....	1931	6,477	1,663,003	1,802,748	112,671	63,836	60.7	3,848,829	1,501,602	850	500	37.0	269
	1930	6,468	1,873,590	2,049,428	139,661	72,032	60.6	4,349,374	1,760,370	1,046	515	23.1	353
New York, Chi. & St. L....	1931	1,660	482,264	491,444	4,359	16,180	59.8	945,017	326,598	176	70	28.5	48
	1930	1,665	619,683	627,826	6,447	19,831	61.1	1,154,015	420,314	200	59	22.9	33
Pere Marquette.....	1931	2,201	335,855	346,708	3,369	8,972	61.1	535,909	197,047	159	26	14.1	45
	1930	2,177	416,738	421,441	4,785	10,567	63.6	622,081	248,307	169	29	14.5	33
Pitts. & Lake Erie.....	1931	235	82,088	83,666	1,031	3,096	59.7	244,420	134,811	60	15	20.6	32
	1930	232	114,461	115,529	1,426	4,221	60.5	333,800	185,768	51	13	20.8	17
Wabash .....	1931	2,497	681,634	708,360	12,196	20,009	61.5	1,162,920	377,221	277	131	32.2	49
	1930	2,497	780,523	826,568	12,267	24,091	62.7	1,389,045	484,561	313	68	17.7	49
Central Eastern Region:													
Baltimore & Ohio.....	1931	5,536	1,338,688	1,550,546	171,912	43,482	61.7	2,800,055	1,198,269	918	237	20.5	282
	1930	5,541	1,680,253	1,947,913	239,707	52,847	61.7	3,488,870	1,577,129	981	184	15.8	157
Big Four Lines.....	1931	2,721	622,076	651,869	18,232	19,313	60.0	1,212,700	518,210	279	152	35.2	62
	1930	2,712	738,593	761,921	17,869	22,717	60.6	1,445,917	640,222	304	151	33.3	30
Central of New Jersey....	1931	692	196,466	217,895	36,339	6,156	56.7	417,683	186,998	144	43	23.2	43
	1930	693	254,622	275,893	42,595	7,344	58.1	487,645	219,131	162	35	17.6	17
Chicago & Eastern Ill....	1931	939	177,019	177,443	2,019	4,489	61.7	278,246	114,059	91	63	41.1	39
	1930	946	217,062	217,762	2,386	5,848	62.8	354,842	150,457	89	48	34.9	25
Elgin, Joliet & Eastern....	1931	447	105,752	109,211	4,259	2,692	59.7	207,891	103,252	80	11	12.5	16
	1930	453	129,793	140,999	5,848	3,628	63.7	272,979	142,006	78	13	14.3	4
Long Island.....	1931	400	42,655	45,809	11,805	555	53.1	40,178	15,446	47	7	12.7	..
	1930	400	44,958	49,718	12,574	555	54.3	39,087	15,115	50	5	9.5	2
Pennsylvania System....	1931	10,668	3,200,036	3,565,482	353,311	110,864	61.7	7,247,613	3,111,666	2,207	330	13.0	777
	1930	10,690	3,536,461	4,035,527	397,899	127,657	62.5	8,375,945	3,711,954	2,402	316	11.6	676
Reading .....	1931	1,446	516,246	563,144	53,030	14,133	58.1	999,870	455,358	315	72	18.5	68
	1930	1,454	588,537	640,988	55,589	16,115	58.9	1,135,284	542,149	325	59	15.3	60
Pocahontas Region:													
Chesapeake & Ohio.....	1931	3,116	900,686	945,235	32,126	32,894	56.2	2,708,645	1,433,439	663	65	8.9	319
	1930	3,086	1,082,755	1,145,973	49,063	39,154	57.5	3,162,702	1,711,464	569	96	14.4	125
Norfolk & Western.....	1931	2,232	619,001	673,143	33,632	22,369	59.6	1,750,345	886,094	457	34	6.9	160
	1930	2,230	754,069	857,857	46,118	28,356	59.7	2,317,595	1,217,566	448	47	9.4	123
Southern Region:													
Atlantic Coast Line.....	1931	5,162	761,018	769,948	11,426	17,899	59.3	1,009,008	349,664	411	79	16.2	80
	1930	5,155	666,053	670,115	8,890	16,846	60.5	938,743	331,827	399	62	13.4	88
Central of Georgia.....	1931	1,900	245,347	246,137	4,938	5,605	65.9	312,009	119,744	109	38	25.6	..
	1930	1,900	267,303	269,193	4,802	6,523	69.3	355,372	146,590	125	27	18.0	6
Ill. Cent. (inc. Y. & M. V.)	1931	6,670	1,499,155	1,515,005	25,728	36,742	60.1	2,409,690	916,516	754	151	16.7	51
	1930	6,694	1,749,902	1,762,949	29,949	46,660	60.4	3,061,710	1,206,120	707	128	15.3	31
Louisville & Nashville....	1931	5,267	1,198,352	1,260,032	32,860	24,820	58.3	1,699,060	763,451	538	160	23.0	125
	1930	5,242	1,453,590	1,537,980	45,014	31,471	58.7	2,171,774	1,006,553	564	125	18.2	82
Seaboard Air Line.....	1931	4,466	572,843	583,716	6,918	13,596	59.6	815,622	284,080	272	26	8.7	27
	1930	4,484	574,944	595,441	7,260	14,553	62.4	836,348	310,806	268	28	9.5	1
Southern .....	1931	6,675	1,319,846	1,336,706	26,526	31,152	64.1	1,746,860	671,274	787	185	19.0	198
	1930	6,676	1,396,879	1,426,418	27,461	34,868	63.4	1,986,881	771,460	796	155	16.3	162
Northwestern Region:													
Chi. & North Western....	1931	8,459	1,097,375	1,160,664	27,780	28,490	62.5	1,668,444	598,200	717	150	17.3	194
	1930	8,459	1,268,481	1,339,261	26,009	33,488	62.1	1,967,779	718,132	761	91	10.6	155
Chi. Gt. Western.....	1931	1,459	230,313	230,313	14,591	7,662	59.4	460,385	164,796	111	20	15.1	13
	1930	1,459	275,564	306,250	23,614	8,421	63.5	479,379	180,538	112	8	6.9	11
Chi., Milw., St. P. & Pac.	1931	11,302	1,266,415	1,339,335	64,576	35,538	61.9	2,148,636	844,406	771	147	16.0	340
	1930	11,350	1,525,639	1,619,253	86,544	44,495	62.4	2,669,075	1,085,901	798	156	16.3	255
Chi., St. P., Minn. & Om.	1931	1,714	228,651	245,558	10,560	5,005	65.8	281,295	112,293	153	22	12.5	65
	1930	1,724	272,139	292,502	11,378	5,759	65.3	319,627	125,358	150	28	15.7	48
Great Northern .....	1931	8,342	578,177	584,905	19,146	19,346	67.5	1,131,938	500,029	484	134	21.7	153
	1930	8,338	713,878	727,334	35,289	24,551	67.8	1,402,038	623,344	455	151	24.9	66
Minn., St. P. & S. St. M....	1931	4,356	352,307	359,987	3,965	8,982	67.4	486,120	195,344	147	70	32.2	40
	1930	4,388	396,032	408,390	5,066	11,117	67.6	591,962	243,160	180</			



## Compared with April, 1930, for Roads with Annual Operating Revenues Above \$25,000,000

Region, road and year	Average number of freight cars on line			Per cent un-serv-icible	Gross ton-miles per train-hour, ex-cluding loco-motives and tenders	Gross ton-miles per train-mile, ex-cluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Loco-motive-miles per locomotive-day
	Home	Foreign	Total										
New England Region:													
Boston & Albany.....1931	3,465	3,302	6,767	9.8	21,922	1,472	492	17.5	347	30.1	5,764	154	41.5
1930	4,138	3,841	7,979	4.8	19,675	1,315	459	18.1	345	29.0	6,752	158	56.8
Boston & Maine.....1931	11,155	8,210	19,365	8.9	23,764	1,891	696	19.3	379	28.7	3,557	105	44.5
1930	11,433	10,442	21,875	4.3	22,972	1,787	657	19.0	362	27.2	3,837	107	53.2
N. Y., New H. & Hart..1931	18,871	12,944	31,815	15.3	25,437	1,911	706	20.0	291	22.5	4,420	108	46.9
1930	16,846	13,532	30,378	11.5	24,733	1,880	689	19.7	328	25.9	4,732	108	51.7
Great Lakes Region:													
Delaware & Hudson....1931	10,432	4,065	14,497	3.8	26,703	2,061	930	27.6	574	33.6	9,495	122	48.6
1930	11,088	5,077	16,165	3.8	26,401	2,059	940	27.3	561	32.1	10,368	127	54.3
Del., Lack. & Western..1931	19,100	5,282	24,382	6.4	25,824	1,916	767	22.7	438	29.2	10,700	139	62.5
1930	19,277	6,687	25,964	4.3	25,495	1,933	767	22.3	447	30.2	11,640	137	63.5
Erie (inc. Chi. & Erie)..1931	35,206	12,648	47,854	4.1	39,647	2,684	1,009	22.6	504	36.5	10,411	102	56.8
1930	34,920	15,749	50,669	4.1	36,333	2,625	1,006	22.8	529	37.6	11,574	107	61.0
Grand Trunk Western...1931	4,317	8,693	13,010	10.8	26,629	1,675	596	20.4	373	29.4	4,760	98	55.2
1930	3,784	10,474	14,258	6.7	24,321	1,619	595	20.0	415	31.2	5,798	108	67.3
Lehigh Valley .....1931	21,745	6,061	27,806	8.1	30,592	1,991	832	25.2	429	26.5	8,890	133	49.2
1930	20,040	6,956	26,996	6.5	27,252	1,820	748	23.9	439	28.2	8,830	146	55.6
Michigan Central.....1931	25,157	15,540	40,697	6.1	36,491	1,906	610	18.1	215	19.5	4,671	106	68.5
1930	23,510	13,021	36,531	5.2	34,989	1,916	633	18.6	292	26.2	5,711	110	78.7
New York Central.....1931	80,392	61,959	142,351	9.4	34,232	2,314	903	23.5	352	24.6	7,728	99	47.3
1930	76,092	63,105	139,197	4.4	32,631	2,321	940	24.4	422	28.5	9,073	103	53.6
New York, Chi. & St. L. 1931	15,323	7,688	23,011	7.4	31,063	1,960	677	20.2	473	39.2	6,557	99	67.2
1930	14,864	9,244	24,108	7.9	28,748	1,862	678	21.2	581	44.9	8,416	102	81.4
Pere Marquette.....1931	11,588	4,725	16,313	3.9	24,961	1,596	587	22.0	403	30.0	2,984	96	63.1
1930	8,408	7,105	15,513	3.3	22,348	1,493	596	23.5	534	35.7	3,802	100	72.0
Pitts. & Lake Erie.....1931	19,571	3,893	23,464	7.0	38,197	2,978	1,642	43.5	192	7.4	19,121	102	37.7
1930	15,466	6,052	21,518	5.3	38,963	2,916	1,623	44.0	288	10.8	26,690	101	60.5
Wabash .....1931	20,209	8,637	28,846	6.9	33,215	1,706	553	18.9	436	37.6	5,036	111	58.9
1930	17,369	11,791	29,160	2.7	30,307	1,780	621	20.1	554	43.9	6,470	113	73.5
Central Eastern Region:													
Baltimore & Ohio.....1931	80,919	19,337	100,256	5.9	26,686	2,092	895	27.6	398	23.4	7,215	141	49.7
1930	77,565	24,790	102,355	5.5	25,389	2,076	939	29.8	514	27.9	9,488	141	62.6
Big Four Lines.....1931	24,970	20,738	45,708	5.7	31,589	1,949	833	26.8	378	23.5	6,349	112	51.8
1930	25,844	21,711	47,555	4.5	29,189	1,958	867	28.2	449	26.3	7,870	113	57.1
Central of New Jersey...1931	16,985	8,165	25,150	14.4	26,245	2,126	952	30.4	248	14.4	9,005	144	45.2
1930	17,704	9,728	27,432	5.3	24,569	1,915	861	29.8	266	15.4	10,545	148	53.9
Chicago & Eastern Ill....1931	5,811	2,497	8,308	7.7	27,077	1,572	644	25.4	458	29.2	4,049	125	38.8
1930	13,000	3,649	16,649	42.2	27,052	1,635	693	25.7	301	18.6	5,300	128	53.4
Elgin, Joliet & Eastern...1931	9,100	4,724	13,824	5.9	16,855	1,966	976	38.4	249	10.9	7,699	119	41.6
1930	7,574	7,311	16,885	4.4	15,204	2,103	1,094	39.1	280	11.2	10,453	121	53.8
Long Island .....1931	755	5,419	6,174	1.0	6,967	942	362	27.8	83	5.6	1,286	312	35.8
1930	759	4,843	5,602	1.3	6,416	869	336	27.2	90	6.1	1,259	317	37.3
Pennsylvania System....1931	240,782	55,064	295,846	5.7	31,327	2,265	972	28.1	351	20.2	9,722	122	51.5
1930	225,572	70,586	296,158	3.3	29,884	2,368	1,050	29.1	418	23.0	11,575	124	54.4
Reading .....1931	36,446	9,373	45,819	3.5	23,161	1,937	882	32.2	331	17.7	10,494	142	53.1
1930	31,813	11,392	43,205	4.7	22,126	1,929	921	33.6	418	21.1	12,429	144	60.5
Pocahontas Region:													
Chesapeake & Ohio.....1931	50,380	8,207	58,587	2.8	41,261	3,007	1,591	43.6	816	33.3	15,333	81	44.7
1930	41,001	11,163	52,164	2.1	38,588	2,921	1,581	43.7	1,094	43.5	18,489	86	59.9
Norfolk & Western.....1931	40,257	5,866	46,123	.8	40,464	2,828	1,431	39.6	640	27.1	13,234	119	48.0
1930	34,916	7,714	42,630	1.0	42,496	3,073	1,615	42.9	952	37.1	18,200	117	60.8
Southern Region:													
Atlantic Coast Line.....1931	27,070	10,008	37,078	4.9	21,756	1,326	459	19.5	314	27.1	2,258	108	53.2
1930	24,532	9,602	34,134	4.5	21,131	1,409	498	19.7	324	27.2	2,146	110	49.1
Central of Georgia.....1931	6,880	2,559	9,439	12.2	20,087	1,272	488	21.4	423	30.0	2,101	135	56.9
1930	5,913	3,607	9,520	6.9	19,314	1,329	548	22.5	513	33.0	2,572	127	60.1
Ill. Cent. (inc. Y. & M. V.) 1931	52,016	15,203	67,219	8.6	25,357	1,607	611	24.9	454	30.3	4,580	138	56.7
1930	46,430	18,171	64,601	4.7	25,553	1,750	689	25.8	622	39.9	6,006	129	71.6
Louisville & Nashville...1931	52,538	9,304	61,842	11.4	20,672	1,418	637	30.8	412	22.9	4,831	145	61.7
1930	47,261	12,352	59,613	7.8	20,814	1,494	692	32.0	563	30.0	6,401	144	76.6
Seaboard Air Line.....1931	16,509	7,828	24,337	5.1	20,290	1,424	496	20.9	389	31.2	2,120	129	66.0
1930	15,275	8,583	23,858	2.7	19,323	1,455	541	21.4	434	32.6	2,310	127	68.0
Southern .....1931	54,703	12,850	67,553	13.1	20,006	1,324	509	21.5	331	24.0	3,352	152	46.7
1930	53,442	16,913	70,355	11.4	20,429	1,422	552	22.1	366	26.1	3,852	149	51.0
Northwestern Region:													
Chi. & North Western...1931	53,755	20,484	74,239	9.3	21,531	1,520	545	21.0	269	20.5	2,358	130	45.7
1930	50,399	24,096	74,495	6.3	20,871	1,551	566	21.5	321	24.1	2,830	129	53.5
Chi. Gt. Western.....1931	4,602	3,541	8,143	7.6	33,219	1,999	716	21.5	675	52.8	3,765	119	62.7
1930	4,526	3,847	8,373	5.2	24,576	1,740	655	21.4	719	52.8	4,124	135	91.6
Chi., Milw., St. P. & Pac. 1931	60,172	13,332	73,504	2.9	24,278	1,697	667	23.8	383	26.0	2,490	119	51.0
1930	55,196	18,053	73,249	3.0	23,785	1,749	712	24.4	494	32.4	3,189	123	59.6
Chi., St. P., Minn. & Om. 1931	3,035	7,630	10,665	7.8	17,586	1,230	491	22.4	351	23.8	2,184	117	48.9
1930	2,447	8,371	10,818	6.6	15,931	1,174	461	21.8	386	27.2	2,424	122	57.1
Great Northern .....1931	43,602												

# Odds and Ends . . .

## Flag Day

It may not be generally known that the organization which directs its efforts to the national observance of June 14 as a day to pay honor to the Stars and Stripes, the American Flag Day Association, was founded by William T. Kerr, assistant chief of divisional bureau, tariffs, accounting department, of the Pennsylvania at Philadelphia, Pa. Mr. Kerr is director general of the association and has been its president for 35 years.

## A Fast Locomotive

F. Llewellyn Jones of Ardwyn, Wales, writing to the London Times recently to suggest that old locomotive No. 343 of the Reading be included among the fastest locomotives of the world, gives some pertinent facts regarding a run made in July, 1907, on the Atlantic City Flyer, from Camden, N. J., to Atlantic City. The distance of 55.5 miles between the two cities was covered in 41 minutes, at a speed of 81.2 m.p.h., with a load of 260 tons. Mr. Jones observes that it would be of great interest to know the maximum speed attained on that trip.

## Playwrights

The "stage sense" is strong in two members of the Southern Pacific family. F. S. Smith, information clerk at the Ferry building at San Francisco, is the author of a play "The Trail of the Padres," which was produced recently by the Mountain Play Association on the slopes of Mt. Tamalpais, Cal. A month earlier R. E. Greenwell, son of C. J. Greenwell, master car repairer of the Tucson division, directed, in addition to having been the author, a pageant entitled "Romance of the Old Pueblo" which was staged by the citizens of Tucson, Ariz., near the foothills of the Catalina mountains.

## A Horse on This Engineman

Whether any of the ancestors of the particular horse involved in this tale ever served as railroad motive power before the advent of the steam engine we have no way of knowing. Perhaps this horse merely succumbed to the same fever that causes motorists to try to win over a train at a railroad crossing, but with different results in this case. At any rate, as Engineman Gilson of the Louisville & Nashville left Evelyn, Ky., with passenger train No. 3 one afternoon recently, a horse started down the track ahead of the locomotive. According to the Beattyville (Ky.) Enterprise the horse kept ahead of the train and munched grass along the right of way as it made the next three station stops. Beyond the third station is Yellow Rock tunnel, seven miles from Evelyn. The horse entered the tunnel ahead of the train, and as the train entered Engineman Gilson slowed down and turned on his headlight. Once the headlight was turned on the horse walked off the track and out of the tunnel just ahead of the train.

## At 43 Still a Marathoner

At 43 years of age, Trainman Clarence N. Peckham of the Long Island, short and wiry, is taking part in his twenty-fourth year as a marathon runner, and continues to finish well up among the leaders. In one of his latest appearances in competition he was one of 56 contestants in the New York Metropolitan A. A. U. cross-country championship. Peckham was among the sixteen runners who completed the 26-mile circuit of Jersey City and environs. During 1930, Peckham took part in a number of long-distance outdoor cross-country runs, covering a total of 176 miles. He began his running career as a miler and gradually increased the distance until he developed into a seasoned marathoner. Now he does not enter a foot race unless it is six miles or more in length. In 1927 Trainman Peckham captured the five-mile cross-country championship of Long Island, out of a field of 40 participants. In 1929, he won the cross-country championship of Suffolk

county, Long Island, and finished second and third in a number of outdoor runs. In 1933, after completing a quarter century of athletic work, Peckham plans to withdraw from the strenuous game of matching strides with the best cross-country runners of America.

## Tornado Outdistanced

Passengers on the observation platform of the North Coast Limited of the Northern Pacific watched spellbound the antics of the tornado which derailed the Empire Builder of the Great Northern, on April 27, near Moorhead, Minn., for nearly half an hour before it struck that train. The crew of the North Coast Limited, which passed Moorhead ahead of the Empire Builder saw the cloud approaching and succeeded in outdistancing it.

D. F. Lyons, general counsel of the Northern Pacific, watched the tornado from the observation platform and in describing the sight for a St. Paul newspaper said that he "saw a greenish black cloud hanging over the country a few miles west. It was traveling northeast and we were going southeast. When we first viewed the cloud it was in an open prairie sucking up dust and small pieces of brush. The funnel dipped just as it approached a group of buildings, grabbed the barn and hurled it skyward. I was so busy watching the barn that I did not see the house, which was picked up and demolished. The cloud circled behind us and cut over toward the Great Northern tracks, which are about three miles from the Northern Pacific. About that time the funnel seemed to dip and it is quite possible that it was then that it struck the Empire Builder. It was not until we arrived at Staples, Minn., that we learned that the Empire Builder had been wrecked."

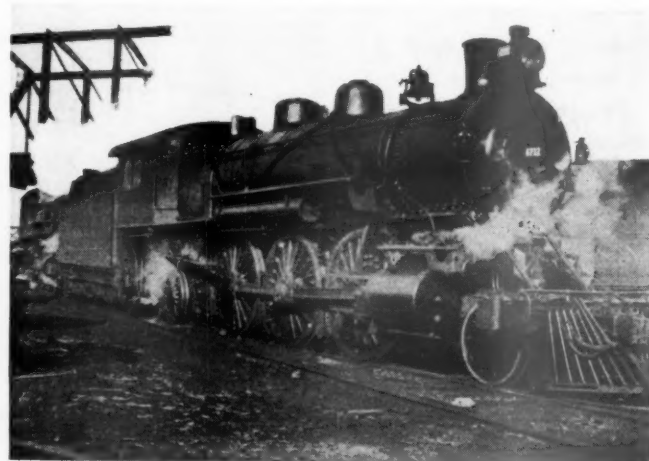
## Another Case of Double Headlights

DETROIT, MICH.

TO THE EDITOR:

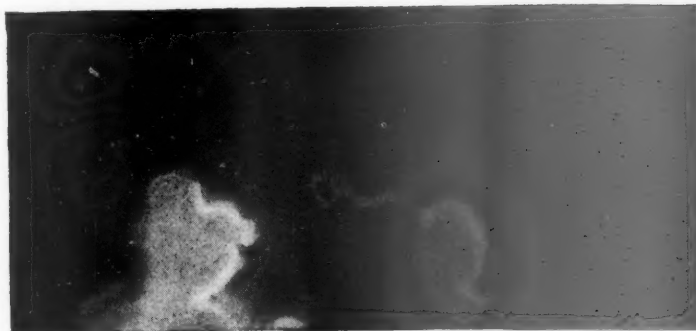
The *Railway Age* for May 9 states that locomotive No. 129 on the New Haven was probably the only locomotive ever operated in this country with two headlights. The accompanying illustration shows Lake Shore & Michigan Southern 2-6-2 Type passenger locomotive No. 4712 at Buffalo, N. Y., about 1909 or 1910. She was ready to back down to the Union station to take her train out. You will note she has two headlights, the reason for which I never found out, but believe the electric headlight was being tried out in comparison with the oil light which you will note is located on top of the smoke box in front of the stack. The old L.S. & M.S. did not use electric headlights at that time and was opposed to them because of the confusion resulting in meeting on double track.

ARLINGTON BRYANT.



Lake Shore & Michigan Southern Locomotive with Two Headlights





## USE SUPER-POWER INTENSIVELY for Maximum Net on Reduced Traffic

■ WITH A falling-off in gross, many railroads are keeping up their net surprisingly well.

This is particularly true of roads with progressive motive power policies. Today the proportion of freight handled by modern and efficient locomotives is much higher than before. This is due to intensive use of Super-Power, while less efficient locomotives have been retired as traffic declined.

As traffic picks up you will waste your increasing gross if you return these older locomotives to service.

Retire the obsolete types and buy additional Super-Power to insure continued maximum net as business resumes.



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### LIMA LOCOMOTIVE WORKS

Incorporated

LIMA

OHIO

# NEWS

## Cotton Rates to Compete With Trucks

The Interstate Commerce Commission has issued a further modification of its order prescribing a readjustment of cotton rates, Part 3 of the general rate structure investigation, postponing until June 25, 1932, the effective date of that portion of the original order which prescribed a relation between the rates from Mississippi Valley territory to New Orleans and Mobile, so as to permit the railroads serving New Orleans to establish truck-competitive rates from points of origin in Mississippi Valley territory to New Orleans, wherever necessary to meet motor truck competition, without the necessity of observing any specific relation between such rates and the rates from the same points to Mobile, where motor truck competition does not exist at all, or to the same extent.

The roads will be required to make a showing in each case of the nature and extent of the truck competition, and the commission has prescribed a minimum scale ranging from 12 cents for five miles up to 31 cents for 200 miles. For distances over 200 miles the minimum to be collected and retained is to be 65 per cent of the carrier privilege rate after deducting the 15-cent compress charge.

The report states that truck competition for cotton to New Orleans made its appearance for the first time during the 1930-1931 cotton shipping season and extended north from New Orleans about 150 miles, and that while the annual production of cotton in this territory is approximately 250,000 bales, it is estimated that notwithstanding the establishment of competitive rates by the railroad early in September, 1930, approximately 10,000 bales moved by truck to New Orleans, during the season, which would otherwise have moved over Illinois Central system lines. A similar order was recently issued as to rates to Texas ports.

## Thirty-Eight Trains Discontinued in Illinois

A report compiled by the Illinois Commerce Commission shows that since January 1, 38 passenger trains have been discontinued in the state because of lack of patronage. Most of the trains suspended were engaged in local service, although a few operated 200 miles or more. Two of the trains discontinued were operated only on Sundays and six were engaged only in suburban service. At present the commission has on file more than 20 applications from railroads seeking further to curtail train operations due to constantly declining revenues.

"The question 'What is wrong with the railroads?' becomes 'What is wrong with the American people?' The railroads are alert to their problem but the people, vitally concerned with the outcome of the fight, forget past loyalties to a public necessity that has never failed them, and leave the onus on the shoulders of railroad executives. The railroads want fair, not favored, treatment. They want their competitors placed on an equal basis with themselves, either by a removal of the restrictions placed on the railroads or by the imposition of similar restrictions on commercial motor vehicles. It is time for a return of confidence in the railroads; we should see that they are accorded the fair treatment they deserve."

—Scientific American.

## Carriers to Answer Order of I. C. C. on Rate Increase Petition

A resolution calling for an advance of 15 per cent in freight rates was adopted by authorized representatives of the carriers of the Eastern, Western, Southern and Mountain-Pacific groups at Chicago on June 24, at a meeting held following the order of the Interstate Commerce Commission directing the carriers to be more specific in their application for a general increase in freight rates. The resolution, which directs the committee of executives heretofore appointed to answer the commission's order, asks for an advance of 15 per cent in all rates, with adjustments in coal, coke and certain other commodities to preserve existing differentials; asks for increases in international rates; advises that the application is tendered with the concurrence of the water lines participating in rail-and-water rates, and that increases are sought in rail-and-water rates; and states that, as heretofore when general advances have been made, adjustments subsequently found necessary to meet competition and other situations will be made as soon as possible after the proposed increased rates become effective.

## New Commissioner in Kansas

Charles W. Campbell of Norton, Kan., has been appointed a member of the Kansas Public Service Commission to succeed Charles D. Shukers, deceased. Mr. Campbell is president of the First National Bank at Norton.

## Rail and Motor Leaders Confer on Problems

Representatives of the motor industry and the Association of Railway Executives held a meeting June 19 at the Biltmore Hotel, New York, at which the future of transportation, so far as it affects both industries, was discussed. The conference was held for the purpose of considering the general transportation situation with a view of reaching a clearer understanding as to their mutual problems. No definite conclusions were reached and further conferences are expected to be held.

This conference was in line with the announced policy of the railway executives to confer jointly with the various shipping and other interests as to the problems of the railways and was the second such conference that has been held, the first one having been with representatives of the oil industry on May 22. The series of conferences grew out of the adoption last November by the railroads of the Declaration of Policy, in which attention was called to the serious effects which the other forms of transportation are having on both the traffic and revenues of the railroads.

The conference was attended by the following:

A. J. Brosseau, president, Mack Trucks; Alfred H. Swayne, vice-president, General Motors Corporation; R. P. Page, Jr., president, Autocar Company; T. R. Dahl, vice-president, The White Company; Walter P. Chrysler, president, Chrysler Corporation; Byron C. Foy, president, DeSoto Motor Corporation; Paul W. Seiler, president, General Motors Truck Corporation; Alfred Reeves, general manager, National Automobile Chamber of Commerce; Pyke Johnson, N.A.C.C. Washington representative; Edward F. Loomis, manager, N.A.C.C. Truck department; LaRue Brown, N.A.C.C. counsel.

P. E. Crowley, president, New York Central; Daniel Willard, president, Baltimore & Ohio; C. W. Galloway, vice-president, Baltimore & Ohio; Hale Holden, chairman, Southern Pacific; Ralph Budd, president, Great Northern; W. R. Cole, president, Louisville & Nashville; Elisha Lee, vice-president, Pennsylvania; C. E. Smith, vice-president, New York, New Haven & Hartford; J. J. Bernet, president, Chesapeake & Ohio; P. J. Neff, assistant vice-president, Missouri Pacific; S. T. Bledsoe, chairman of the executive committee, Atchison, Topeka & Santa Fe; M. J. Gormley, executive vice-president, American Railway Association and R. H. Aishton, Alfred P. Thom and Dr. C. S. Duncan of the Association of Railway Executives.



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# KEEP CARS MOVING

with

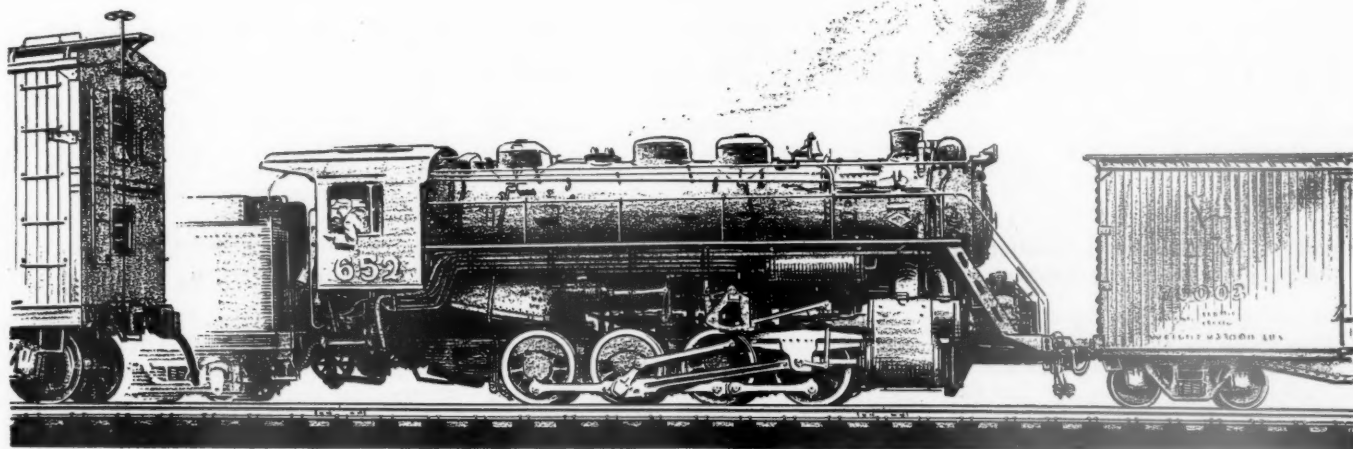
# MODERN SWITCHERS

EVERY UNNECESSARY minute a car is held in the yard adversely affects the mileage record and cuts down efficiency.

Modern Super-Power locomotives keep cars speeding on the road. Don't slow them up by switchers that were built to operate under conditions that existed fifteen years ago.

Progressive roads are balancing modern road engines with modern switchers—switchers that incorporate the Limited Cut-Off to save up to 30% in fuel and that use The Locomotive Booster to handle Super-Power train loads without cutting.

When you build a new switcher build it modern and don't forget the Lateral Motion Driving Box.



**FRANKLIN RAILWAY  
SUPPLY COMPANY  
INCORPORATED**

NEW YORK

CHICAGO

ST. LOUIS

SAN FRANCISCO

MONTREAL

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### Reduced Rates Proposed for Short Hauls of Iron and Steel

Tariff-publishing agents of the railroads in official and central territories have filed with the Interstate Commerce Commission applications for sixth section permission to put into effect on July 1 on short notice freight rates on iron and steel articles for hauls of 100 miles or under, which are considerably less than those prescribed by the commission following its investigation of these rates under the Hoch-Smith resolution. The proposed rates are the same as those recently authorized by the Pennsylvania Public Service commission for intrastate application in that state and are intended to meet the competition of motor trucks and barges operating on the Ohio and Monongahela rivers. Whereas the commission's mileage scale begins at 6 cents per 100 lb for distances of 5 miles or less, the proposed short-haul scale begins at 3 cents and ranges up to 16 cents for 100 miles. Before the revisions made by the commission the roads made very low rates for short hauls of such articles, considering them as practically inter-mill movements, whereby articles are taken from one mill to another for further processing, and the establishment of the rates prescribed by the commission led to an increased movement by truck or water.

### Nash Heads Western Railway Club

J. H. Nash, western manager of the Dri-Steam Valve Sales Corporation at Chicago, has been elected secretary of the Western Railway Club.

### Boston-Chicago Fast Freight by the Pennsylvania

The Pennsylvania, on June 18, cut the schedule of its fast freight service between Boston, Mass., and Chicago, so as to provide third morning delivery instead of fourth morning delivery. This action follows the establishment of third morning delivery eastbound during the latter part of April. North of New York, this train is run over the New York, New Haven & Hartford.

### Engineers' Club Suggests Solution of Minneapolis Crossing Problem

Rerouting of the Chicago, Milwaukee, St. Paul & Pacific trains over other railroads through Minneapolis, Minn., and St. Paul has been proposed by the Engineers' Club of Minneapolis as a substitute for elevation or depression to eliminate 40 crossings of streets in the two cities. The initial expenditure for grade separations which have been ordered or proposed is estimated at \$10,000,000.

The plan contemplates the diversion of through freight and passenger trains of the Milwaukee between St. Paul, Minneapolis and Hopkins to the Great Northern, the Northern Pacific, the Minneapolis & St. Louis and the Minnesota Western lines, which have practically no street crossings at grade. Operation over the existing Milwaukee

tracks would be confined to switching movements during certain periods designated by city ordinance for serving industries located along these lines. Certain portions of the Milwaukee line in the Twin Cities are used by the Chicago, Rock Island & Pacific and the Minneapolis, St. Paul & Sault Ste. Marie and the trains of these roads would also be diverted.

The Engineers' Club committee also points out that the rerouting plan will facilitate the consolidation of passenger facilities in Minneapolis into a union station similar to that in St. Paul.

### Union Pacific Employees Appeal to Public Through Newspaper Ads

A vigorous appeal to the public in Omaha, Neb., and Council Bluffs, Iowa, to ship by rail was contained in a double-page advertisement sponsored by the Union Pacific Employee Boosters' League which appeared in the two Omaha daily newspapers on June 10. In addition to carrying the signature of the secretary of the boosters league the advertisement was signed by the general chairmen for the Union Pacific of the five train service brotherhoods.

The appeal carried such catch lines as "Railroads Maintain Prosperity Boulevard," "For Transportation—Use the Railroads," "Progress, Prosperity and the Railroads," "Ship by Rail for a Bigger and Better Omaha and Council Bluffs," and "Keep Our Cities Out in Front." The advertisement continued:

"These cities owe their growth and such prosperity as they have enjoyed primarily to their unsurpassed railroad facilities. Similarly future growth and future prosperity are vitally concerned with any matters which impede the railroads. These wonderful railroad facilities are adequate for all transportation needs and should be used instead of truck which can supply only a small part of these needs. Business given to truck transportation companies, besides directly injuring the railroads, is responsible to a large degree for railroad unemployment. This in turn strikes directly at the pocketbook of every business man and every citizen of this community."

In an open letter to the public the boosters' league calls attention to the fact that the annual Union Pacific payroll in Omaha and Council Bluffs is \$12,286,171; in Council Bluffs and the state of Nebraska is \$20,035,651, and that the Union Pacific annually pays taxes of \$1,803,173 in Nebraska. The number of employees of that railroad in Council Bluffs, and the state of Nebraska is 11,418.

After pointing out the various forms of transportation with which the railroads must compete on more or less unequal terms, the resolution signed by the five general chairmen called upon Union Pacific employees in cities along the line to form committees for the purpose of calling the attention of merchants and shippers, and the public generally, to the seriousness of the plight of the railroads.

### Track Supply Association to Aid Railways

As an aid in restoring the railways to normal purchasing power, the Track Supply Association, composed of manufacturers who exhibit at the convention of the Roadmasters association materials and equipment designed for use in the maintenance of railway tracks and structures, is encouraging its members to foster shipments by rail. The executive board of the association met at Chicago on June 10 and discussed the condition of the railway supply business, the effect of competitive forms of unregulated traffic on the prosperity of the railroads, and means of improving the present condition brought about by unregulated and undertaxed transportation. It was the consensus of the executive board that "even were the country not suffering from the current business depression, the revenues of the railroads would still be so seriously impaired as to adversely affect their buying power to such an extent as to cause hardships in the railway supply industry."

The board has therefore urged the members of the association to insist that all shipments into and out of their plants be made by rail and not by highway motor truck; to place the instructions "Ship by rail" on all purchase orders; to travel by rail in preference to highway motor bus when in pursuit of company business; to write their state legislators, congressmen and senators, requesting support with their votes for any and all measures regulating motor trucks, pipe lines, aviation, internal waterways and coastal navigation in the interest of fair competition with the railroads; and to educate their employees and their friends to the necessity for laws and regulations which will permit the railroads to continue to function.

### Five Day Week for Southern Shops

Shop employees of the Southern have recently voted in favor of a plan proposed by the management for placing its shop operations on a five-day week basis, instead of operating for six days a week with fewer men. The vote was necessary because the employees had an agreement with the company on a six-day basis.

### Avis Shops To Be Closed

The operation of the locomotive shops of the New York Central at Avis, Pa., is to be discontinued at the end of July and most of the machinery will be sent to the shops of the company at West Albany, N. Y. Arrangements will be made to enable employees to follow the work to West Albany so far as their seniority entitles them to positions.

### Illinois Terminal Gets Steam Road Rates for Carrying Mails

The Interstate Commerce Commission has issued a decision holding that the Illinois Terminal Company, which operates 552 miles of line in Illinois, of which 462 miles is electrically-operated, is a "railway common carrier" within the meaning of the railway mail pay act of 1916, and not an interurban electric rail-





# Life Is Growing Harder . . . .

for the LOCOMOTIVE ARCH

**A**RCHES are working harder than ever before. Locomotives demand more steam which in turn demands more coal and greater work from the Arch.

Runs are longer and speeds greater, still further adding to the strain on locomotive Arches. Mileage piles up faster.

So that correct engineering, improved Arch Brick and careful service are more important than ever. The more exacting the service becomes, the more apparent the desirability of putting the whole matter of locomotive Arches up to the American Arch Company.

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THERE'S MORE TO SECURITY  
ARCHES THAN JUST BRICK

---

**HARBISON-WALKER  
REFRACTORIES CO.**  
Refractory Specialists



**AMERICAN ARCH CO.**  
INCORPORATED  
Locomotive Combustion  
Specialists

way common carrier, and is therefore entitled to rates for the transportation of mail (as prescribed by the commission in its order of July 10, 1928) from December 17, 1930, the date when it applied to the commission for a re-examination.

### Salary Reduction for Officers of Pennsylvania

Directors of the Pennsylvania at a meeting on June 24 approved a reduction of 10 per cent in the salaries of all executives and general officers of the company. At the same meeting action was taken reducing the annual dividend rate from 8 per cent to 6 per cent on the common stock of \$50 par value.

### Special Service for Automobiles Extended

Shipment of automobiles by fast freight, the transportation to be paid for in passenger tickets, is now available to any point on the Pennsylvania. Five standard railroad tickets will cover the passage of two passengers and one automobile and the automobile generally will reach its destination within 24 hours after the arrival of the passenger.

### Reciprocity Hearings

The Interstate Commerce Commission has postponed from July 2 to July 20 the hearing at Cincinnati in connection with its investigation of reciprocity in purchasing and routing, before Special Examiner J. L. Rogers; and has announced an additional hearing at St. Louis on July 8 for testimony relating to the Missouri Pacific, the Missouri-Kansas-Texas, the Wabash and the St. Louis-San Francisco.

### Rock Island to Discontinue Two-Cent Rate

The Chicago, Rock Island & Pacific will discontinue its experimental passenger rates of two cents a mile when the tariffs expire on July 1. These reduced rates were put into effect on certain portions of the system in order to ascertain whether they would return a larger volume of business, but failed to justify their continuance.

### Private Barge Line Between New Orleans and St. Louis

The Mississippi Barge Line Company, a privately-owned organization, has established service on the Mississippi river between New Orleans, La., and St. Louis, Mo., the towboat Louisiana arriving at St. Louis on June 16 with two barges loaded with 300 tons of sugar, coffee and miscellaneous freight. L. W. Childress, president of the Columbia Terminals Company, St. Louis, is president, and Carl J. Baer, St. Louis, is vice-president and general manager. The equipment of the company, which represents an investment of \$3,500,000, includes 50 barges and 3 towboats, the Louisiana, the Tennessee and the Indiana. The Tennessee hauls barges up and down the Ohio river, delivering them to or receiving them from the Louisiana or Indiana at Cairo. The latter two towboats operate between St. Louis

and New Orleans, the round trip being made in 20 days. By co-ordination of the tows at Cairo, the line offers regular freight service on the Ohio and the Lower Mississippi.

### Ex-River Coal Rates Suspended

The Interstate Commerce Commission has suspended from June 22, until January 22, the operation of tariff schedules published by the Wheeling & Lake Erie and the Lorain & West Virginia which propose to establish reduced rates on bituminous coal received from boat lines on the Ohio river and forwarded through Wheeling & Lake Erie stations on its Ohio river branch between Martins Ferry and Steubenville, Ohio, when destined to Cleveland, Canton and Massillon, Ohio, on the Wheeling & Lake Erie, and Lorain and South Lorain, Ohio, on the Lorain & West Virginia, and intermediate points.

### Excursion Tariff Suspended

The Interstate Commerce Commission has suspended from June 20 until January 20, the operation of tariff schedules published by the Chicago Great Western, the Minneapolis, St. Paul & Sault Ste. Marie, and the Pullman Company, which propose to establish a reduced round-trip excursion passenger fare of \$10 between Chicago, Forest Park and Maywood, Ill., on the one hand, and Minneapolis, and St. Paul, Minn., on the other hand, together with reduced Pullman charges. The suspended tariffs were intended to be applicable only from June 20 to June 22, 1931.

### Merger of P.R.R. and Reading Lines in N. J. Discussed

Merger of Reading and Pennsylvania lines in Southern New Jersey is being discussed in connection with the pending grade crossing elimination and union station program at Atlantic City, N. J. Recent news reports from Atlantic City quote F. M. Flack, general manager of the Reading, as declaring in favor of such unification following a conference with Mayor Bacharach. Also, Agnew T. Dice, president of the Reading, in a recent address at Camden, N. J., characterized the co-ordination of railroad lines in Southern New Jersey and the regulation of interstate highway carriers as the greatest present transport needs of the area.

### S. P. Protests Proposed Texas Line

The proposed construction of the Winter Garden Belt between Asherton, Tex., and Eagle Pass, 70 miles, was opposed by the Southern Pacific at a hearing before H. E. Davis, examiner for the Interstate Commerce Commission, at a hearing held at Eagle Pass on June 16. In support of its protest, representatives of the Southern Pacific offered evidence showing that its branch from Spofford, Tex., to Eagle Pass, 32 miles, had an operating deficit of \$56,000 in 1930. T. N. Picnot, president of the Winter Garden Belt, testified that the 67,000-acre irrigation project in the Rio Grande valley near Eagle Pass has no adequate transportation outlet and the proposed railroad will

be provided with a heavy tonnage of vegetables, citrus fruits and other agricultural products.

### Trans-Missouri-Kansas Shippers' Board

Commodity committee reports submitted at a meeting of the Trans-Missouri-Kansas Shippers' Advisory Board at Wichita, Kan., on June 20, estimate carloadings for the third quarter of this year at 506,102 cars, a decrease of 23,709 cars as compared with the same period last year. George S. Milnor, general manager of the Farmers' National Grain Corporation, predicted a larger wheat export business this year due to the poor wheat crop prospect in Canada, and indications of only a fair yield in European countries. L. E. Webb, president of the Kansas Co-operative Grain Dealers' Association, estimated that 50 per cent of the 1931 wheat crop will be piled outdoors on the farms because of the low price and lack of storage facilities.

### May Locomotive Shipments

May shipments of railroad locomotives from principal manufacturing plants, based on reports received by the Department of Commerce, totaled 26 locomotives, as compared with 15 in April, and 58 in May, 1930. The following table shows shipments and unfilled orders of locomotives for May, 1930, and 1931, the 1930 totals and totals for the first five months of the two years.

Year and Month	Railroad Locomotive Shipments				
	Domestic			Foreign	
	Total	Steam	Electric	Steam	Electric
1931					
May .....	26	26	18	1	..
Total (5 mos.)	82	63	18	1	..
1930					
May .....	58	56	..	2	..
Total (5 mos.)	342	322	7	10	3
Total (year) ..	763	706	33	17	7
Unfilled Orders, end of May					
	Domestic			Foreign	
	Total	Steam	Electric	Steam	Electric
1931 .....	58	47	..	11	..
1930 .....	420	367	44	5	4

### Canadian Minister of Railways Statement on C. N. R.

An important statement of the attitude of the present Canadian Government toward the Canadian Pacific and the Canadian National was made in the House of Commons last week by Hon. Robert J. Manion, minister of railways, in the Budget debate. He denied charges that the Bennett Ministry were enemies of the Canadian National, told the people of Canada that they cannot expect to have further capital outlays on the road and also reduced freight rates on both roads and have those systems in anything even approaching a healthy condition financially. He denied, too, Liberal suggestions that the speech of John T. Hackett, a Quebec Conservative, a few days ago in which he made a fierce attack on the publicly-owned system, reflected the views of the present administration.

Dr. Manion at the outset argued that members of the Opposition should not charge the present Government with being enemies of the Canadian National,

Continued on Third Right Hand Page



for, he said, it was the Liberal Administration that had really urged upon the management of the road many large capital expenditures which were now such heavy financial burdens upon the system. The Halifax Hotel, he said was as much needed as the proverbial fifth wheel on a wagon, the Saskatoon Hotel was three times as big as business would warrant, while the new hotel in Vancouver was to cost over \$9,000,000, when the much-

maligned "shadow Government" in 1926 had specified that that structure was not to cost more than \$3,500,000.

Dr. Manion paid a high tribute to Sir-Henry Thornton for his work in increasing the efficiency of the system. Figures were given by Dr. Manion to show the present financial position of the road and the extent to which the people of Canada were interested in the system. He declared that the suggested plan for recon-

structing the finances of the road would be of no advantage at this time and said he had a statement from Sir Henry Thornton expressing the same view.

Defending the course of the Government in careful scrutiny of the expenditures of the railway, Dr. Manion said that in view of the tremendous investment in the road by the people of Canada it was the duty of the Government to carefully examine all expenditures. "As friends

## Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from the Monthly Reports of Revenues and Expenses for 170 Steam Railways, Including 16 Switching and Terminal Companies.

FOR THE MONTH OF APRIL, 1931 AND 1930

Item	United States		Eastern District		Southern District		Western District	
	1931	1930	1931	1930	1931	1930	1931	1930
Average number of miles operated .....	242,707.67	242,657.87	60,237.25	60,316.76	46,097.70	46,128.22	136,372.72	136,212.89
Revenues:								
Freight .....	\$283,711,179	\$345,815,228	\$123,941,404	\$151,354,372	\$54,717,692	\$65,628,759	\$105,052,083	\$128,832,097
Passenger .....	47,272,282	59,607,633	27,422,911	33,519,609	6,190,966	8,204,494	13,658,405	17,883,530
Mail .....	8,816,889	9,247,394	3,399,412	3,511,632	1,485,967	1,566,797	3,931,510	4,168,965
Express .....	9,013,582	10,960,405	3,731,331	4,879,359	1,687,488	1,768,363	3,594,763	4,312,683
All other transportation .....	12,532,696	15,661,036	7,143,026	8,819,756	1,110,559	1,459,515	4,279,111	5,381,765
Incidental .....	7,641,043	9,167,436	4,163,198	4,973,395	1,179,927	1,349,186	2,297,918	2,844,855
Joint facility—Cr. ....	947,575	1,081,620	303,495	368,308	165,428	196,618	478,652	516,694
Joint facility—Dr. ....	282,938	307,493	75,929	82,952	30,153	33,469	176,856	191,072
Railway operating revenues .....	369,652,308	451,233,259	170,028,848	207,343,479	66,507,874	80,140,263	133,115,586	163,749,517
Expenses:								
Maintenance of way and structures .....	51,483,685	68,218,449	20,973,101	26,383,936	9,219,823	11,984,089	21,290,761	29,850,424
Maintenance of equipment .....	74,858,129	91,058,265	34,929,857	42,289,814	13,397,082	16,512,668	26,531,190	32,255,783
Traffic .....	10,138,695	11,010,251	3,859,594	4,194,519	1,868,299	2,008,246	4,410,802	4,807,486
Transportation .....	135,313,383	158,250,447	64,026,722	75,070,660	22,476,623	26,085,192	48,810,038	57,094,595
Miscellaneous operations .....	3,568,153	4,434,514	1,783,770	2,148,146	427,567	570,600	1,356,816	1,715,768
General .....	15,808,314	16,502,918	6,871,367	7,145,538	2,784,632	2,797,494	6,152,315	6,556,886
Transportation for investment—Cr. ....	552,815	1,195,647	95,915	290,642	47,191	75,058	409,709	829,947
Railway operating expenses .....	290,617,544	348,279,197	132,348,496	156,944,971	50,126,835	59,883,231	108,142,213	131,450,995
Net revenue from railway operations .....	79,034,764	102,954,062	37,680,352	50,398,508	16,381,039	20,257,032	24,973,373	32,298,522
Railway tax accruals .....	28,154,213	29,997,233	11,698,147	12,512,671	5,432,896	5,914,203	11,023,170	11,570,359
Uncollectible ry. revenues .....	66,485	87,903	26,833	29,761	12,697	18,957	26,955	39,185
Railway operating income .....	50,814,066	72,868,926	25,955,372	37,856,076	10,935,446	14,323,872	13,923,248	20,688,978
Equipment rents—Dr. balance .....	8,962,624	8,359,427	4,319,867	4,182,708	1,076,963	682,358	3,565,794	3,494,361
Joint facility rent—Dr. balance .....	2,777,129	2,197,154	1,617,186	1,145,271	261,274	161,920	898,669	889,963
Net railway operating income .....	39,074,313	62,312,345	20,018,319	32,528,097	9,597,209	13,479,594	9,458,785	16,304,654
Ratio of expenses to revenues (per cent) .....	78.62	77.18	77.84	75.69	75.37	74.72	81.24	80.28

FOR FOUR MONTHS ENDED WITH APRIL, 1931 AND 1930

Average number of miles operated .....	242,720.85	242,747.76	60,239.86	60,336.81	46,096.69	46,143.51	136,384.30	136,267.44
Revenues:								
Freight .....	\$1,109,463,872	\$1,356,519,355	\$481,205,434	\$591,539,339	\$215,753,508	\$263,293,853	\$412,504,930	\$501,686,163
Passenger .....	194,225,510	253,191,256	109,240,865	135,280,188	27,892,868	39,551,332	57,091,777	78,359,736
Mail .....	35,199,939	37,081,313	13,477,838	14,054,100	5,980,504	6,280,880	15,741,597	16,746,333
Express .....	28,915,759	38,322,370	11,641,891	17,304,301	5,404,791	6,211,334	11,869,077	14,806,735
All other transportation .....	47,650,394	58,826,826	27,478,523	33,575,660	3,865,160	4,959,850	16,306,711	20,291,316
Incidental .....	30,109,283	36,677,708	16,240,875	19,152,477	4,685,124	5,812,756	9,183,284	11,712,475
Joint facility—Cr. ....	3,756,951	4,312,043	1,223,449	1,383,945	644,408	763,925	1,889,094	2,164,173
Joint facility—Dr. ....	1,061,649	1,245,782	301,177	316,450	105,498	134,033	654,974	795,299
Railway operating revenues .....	1,448,260,059	1,783,685,089	660,207,698	811,973,560	264,120,865	326,739,897	523,931,496	644,971,632
Expenses:								
Maintenance of way and structures .....	183,406,266	238,058,315	77,947,869	97,587,462	36,524,504	46,680,712	68,933,893	93,790,141
Maintenance of equipment .....	299,758,504	370,245,571	139,302,112	171,831,940	53,937,420	67,233,941	106,518,972	131,179,690
Traffic .....	40,045,858	43,968,661	15,266,458	16,935,523	7,669,640	8,266,665	17,109,760	18,766,473
Transportation .....	549,501,146	654,408,605	260,361,277	309,040,842	91,632,119	107,393,282	197,507,750	237,974,481
Miscellaneous operations .....	14,788,648	18,387,091	7,205,979	8,731,416	2,010,268	2,647,888	5,572,401	7,007,787
General .....	62,994,516	65,935,862	27,499,131	28,937,045	10,939,794	11,088,831	24,555,591	25,909,986
Transportation for investment—Cr. ....	2,171,519	3,963,445	387,522	762,215	177,432	398,841	1,606,565	2,802,389
Railway operating expenses .....	1,148,323,419	1,387,040,660	527,195,304	632,302,013	202,536,313	242,912,478	418,591,802	511,826,169
Net revenue from railway operations .....	299,936,640	396,644,429	133,012,394	179,671,547	61,584,552	83,827,419	105,339,694	133,145,463
Railway tax accruals .....	110,163,866	118,144,072	43,966,283	47,074,793	21,877,179	24,061,536	44,320,404	47,007,743
Uncollectible ry. revenues .....	286,717	362,022	137,690	160,910	43,880	54,494	105,147	146,618
Railway operating income .....	189,486,057	278,138,335	88,908,421	132,435,844	39,663,493	59,711,389	60,914,143	85,991,102
Equipment rents—Dr. balance .....	33,340,552	31,084,599	16,783,034	15,943,371	2,880,460	1,226,106	13,677,058	13,915,122
Joint facility rent—Dr. balance .....	10,008,726	8,248,642	5,529,922	4,008,820	981,651	798,605	3,497,153	3,441,217
Net railway operating income .....	146,136,779	238,805,094	66,595,465	112,483,653	35,801,382	57,686,678	43,739,932	68,634,763
Ratio of expenses to revenues (per cent) .....	79.29	77.76	79.85	77.87	76.68	74.34	79.89	79.36

Compiled by Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

of the Canadian National Railways," added Dr. Manion, "this Government is desirous of seeing that both the Canadian National and Canadian Pacific are placed in a more satisfactory position. We want them to work together in reasonable competition.

"To say that we are enemies of the Canadian National is to state an untruth. We are its friends in trying to look after its interests. The question of public ownership does not arise in this matter because we are in public ownership, as far as this big enterprise is concerned, to the extent of over \$2,000,000,000."

Referring to remarks made in the House the other day by Hon. W. D. Euler, former Minister of National Revenue, who had implied that the attack on the Canadian National by John T. Hackett (Conservative, Stanstead), reflected the views of the Government, Dr. Manion challenged Mr. Euler to ask Sir Henry in the national railways committee as to the relationship between himself and the present Government. He would find it quite satisfactory.

Sir Henry Thornton and his officers, continued Dr. Manion, were taking vigorous steps to curtail expenditures and in the past few days a finance committee of the road, consisting of the president, Victor Smart, deputy minister of railways and canals, and Gerald Ruel one of the vice-presidents, had been formed for the purpose of keeping a close check on proposed expenditures. For some months, the minister declared, these officers had been making great efforts to reduce expenditures, to eliminate duplication of service.

On the question of bus and motor competition which had to be faced by the two roads, Dr. Manion declared that such competition was unfair in that the buses could operate on the public highways provided by the taxes of all of the people but with no control over them and no adequate compensation from the buses for the facilities with which they are provided by the people. He said that these buses should be subject to some regulation by the Government.

As to the future Dr. Manion said that as far as the Canadian National is concerned within five years a much more cheerful story could be told. "If the present depression passes and unwise capital expenditures are not indulged in and economic management is maintained, in five years from now there will be a much more cheerful picture for both railways. The real friends of the Canadian National are those who stand for care and economy while the enemies are those who favor or support extravagance or loose expenditures."

### Engineering Students Make Educational Signal Models

The illustration shown herewith is that of a toy railroad lately designed and laid out by students of Massachusetts Institute of Technology, the distinguishing feature of which is its intelligent attention to details, especially the signaling. The cars and locomotives are of the well-known commercial types, running on tracks of  $2\frac{1}{4}$  inches gage and propelled by electricity; but the signal apparatus, including an illuminated track model, is all the work of students, whose purpose is scientific knowledge and practice, not mere entertainment.

The automatic signals are color-light, operated through the means of track circuits. At the grade crossing of one railroad with another, shown in the center of the picture, there is a full installation of automatic interlocking signals, the operation of which is so realistic that thousands of visitors were attracted during the recent annual "Open house" festivities at the Institute (Saturday afternoon, May 2). This was the ninth annual gathering of this kind.

The picture shows only a part of the exhibit, some remotely operated switches being a leading feature. The highway crossing gate operates automatically and the crossing signal is of the usual alternating flash type. Forty-four relays were used in the signal installation. Three or four trains were kept in operation simultaneously.

These young engineers are students in

the co-operative course in railroad operation, in which the Boston & Maine participates with the Institute.

Following the "Open House" festivities, a special demonstration of this signaling apparatus was given for the benefit of railroad officers and other visitors.

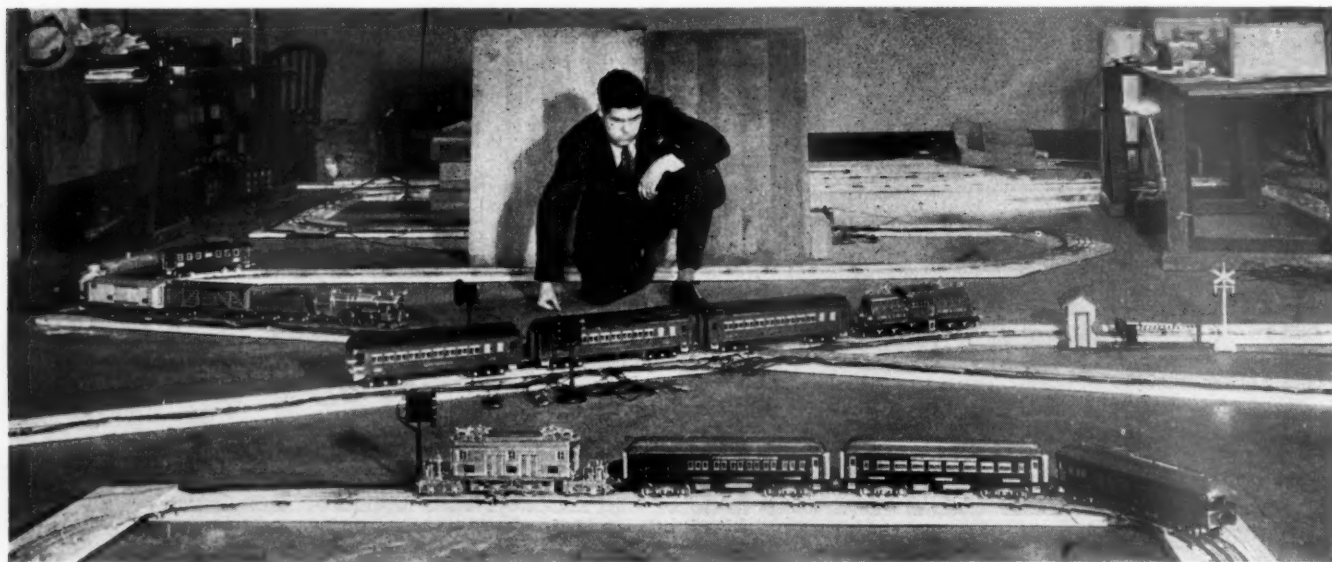
### Continue Discussion of C. N. R. Officers' Salaries

"So far as my own salary is concerned I don't care a hoot, but I do not think the salaries of other officials should be made public," was the statement made last week at Ottawa to the special House committee on national railways and shipping by Sir Henry Thornton, president of the Canadian National when demands for details as to his salary and those of the vice-presidents was renewed by R. B. Hanson (Conservative, York-Sunbury) and Dr. Peter McGibbon (Conservative, Muskoka). Following a lengthy and animated discussion a subcommittee was named to deal with this question of salaries and emoluments.

Hon. Dr. R. J. Manion, Minister of Railways and Canals, who was absent last week when the committee decided to await his return to renew the demand for particulars about salaries, made it plain that the responsibility lay with the committee. He said the committee last week "passed the buck" to him and today he passed it back.

"The present Government," said Dr. Manion, "has not had any discussion of any kind relating to the salaries of Canadian National officials, which salaries were largely fixed by the directors of the railway. If the Canadian National were not in a financial position where it did not require large sums from Parliament, then I would say that the question of salaries would never come before this committee; but in view of the fact that Parliament has had to grant or supply immense sums of money, I assume it is right and proper that members of Parliament should ask pertinent questions."

Sir Henry said the salaries and allowances of himself and other officers were



Miniature Railroad Tracks, Trains and Signals; Massachusetts Institute of Technology

Continued on Next Left Hand Page





# For Super Service

UNDER the present operating conditions every locomotive's wearing part must measure up to that high standard which precludes the use of ordinary materials.

The more you demand from your locomotives the more you need HUNT-SPILLER *Air Furnace* GUN IRON wearing parts to insure efficient and economical performance.

Comparative performance reports show that the locomotives equipped with wearing parts made of HUNT-SPILLER *Air Furnace* GUN IRON have fewer failures, pull heavier trains, make faster time, cost less to maintain and consume less coal.

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Export Agent for Latin America:

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# HUNT-SPILLER GUN IRON

*Air Furnace*

determined by arrangement with the board of directors late in 1929 and had not since been changed. The allowances, in addition to the contract salaries, were approved by the board as essential to the carrying out of Sir Henry's responsibilities. That part of the salaries and allowance not within the contractual obligations were with the knowledge and approval of the late Government. The officers of the company had endeavored to discharge their duties in keeping with their responsibilities. The payments were in keeping with those obtaining in North America and in some cases were materially less.

### Fiftieth Anniversary Pittsburgh Testing Laboratory

The Pittsburgh Testing Laboratory, Pittsburgh, Pa., is this year celebrating its fiftieth anniversary, in commemoration of which it has published an interesting 32-page booklet illustrating its modern-equipped laboratories and many of the problems of industry which have been subject to its inspection, research or test.

The Laboratory was established in 1881 by Alfred E. Hunt and George H. Clapp, chemists and metallurgical engineers, under the name of Hunt and Clapp—Pittsburgh Testing Laboratory. This was in the early days of the steel industry and the firm became known as experts on steel, iron and other metallurgical problems, manufacturing processes and finished products incidental thereto. Aluminum was first produced on a commercial scale after research along the lines of the Hall patents by the Pittsburgh Testing Laboratory, both Mr. Hunt and Mr. Clapp being active in the organization of what has now become the Aluminum Company of America.

The company built its own six-story building at the time of its incorporation in 1906 and since 1924 it has occupied its present quarters, having five times the floor space, with additional adjoining property for future development.

In addition to chemical and physical tests and investigations, the Laboratory performs engineering inspection of all kinds and conducts research and special investigations into processes and industrial methods. B. H. Witherspoon is president of the organization; A. R. Ellis, vice-president, and F. O. Gardner, secretary-treasurer. Mr. Clapp is a director of the Pittsburgh Testing Laboratory, also a member of the board of directors of the Aluminum Company of America.

### Value of Radio to C. N. R.

The advertising value of radio for the railway and the traffic value of this equipment on trains was dealt with last week by Sir Henry Thornton, president of the Canadian National, before the House Committee on National Railways at Ottawa.

SIR HENRY THORNTON: "I should say that, generally speaking, the advantage of it from a propaganda and advertising view has justified the expense, particularly in the prosperous times which we passed through until recently.

"You have got to remember, if I may say so, in connection with the Canadian National system and the whole advertising situation, that up until the last few years, or up until eight years or so ago the Canadian National system was relatively unknown. To a considerable extent it still is. We frequently have cases of people, travellers and shippers in the United States, who confuse the Canadian Pacific with the Canadian National. They just know that there is some kind of a Canadian railroad in Canada and they are not altogether sure whether it is Canadian National or something else.

"Now, one of the problems which the Canadian National had to meet in securing both passenger and freight traffic was to establish its identity as a transportation machine. On the other hand the Canadian Pacific had been in existence for several decades, had been the predominant railway in Canada, was well and favorably known, and rightly so, all over the North American continent, in fact all over the world, and we were like any other manufacturer who goes into a new field manufacturing some commodity, he has got to establish himself within the knowledge and the minds of purchasers that he is in the business otherwise people do not go to him. A man, for instance, who opens a new department store in a large city initially is obliged to go into a very considerable expense to establish himself which his older competitors may not at that time have to carry, but which they probably did have to incur at the time they started.

"So that the large problem which confronted the Canadian National system was to advertise itself and establish its identity as a producer and seller of transportation, and all of those things, one of which you have referred to, and many others, were simply for that purpose."

MR. HANSON: "Sir Henry, in my humble opinion, the use of radio is perfectly legitimate, that is, the use that you make of it; but the criticism we have here, sir, is the establishing of the radio on the trains, and you are not proceeding, I understand, with that."

SIR HENRY THORNTON: "No. That is a subject which is generally engaging our attention."

MR. CANTLEY: "Sir Henry, I wish you would take it out. It is a nuisance."

SIR HENRY THORNTON: "The cost of equipping our trains for radio reception was \$35,800. Now, opinions vary. Some people like it and some do not. I think on the whole more people like it than dislike it. It is very much like the question of whether you are going to allow people to smoke in the parlor car and on the rear end of the train. Some want to smoke and some do not and it is almost hopeless to try and satisfy them all."

MR. GEARY: "It is quite all right if you can differentiate there. You do not need to have the loud speakers."

SIR HENRY THORNTON: "We have been getting away from the loud speaker as rapidly as possible, simply leaving it to the individual to use the ear telephone or not."

MR. HANSON: "What has been your

capital cost for the installation of radio, both branches?"

SIR HENRY THORNTON: "\$170,000."

MR. FRASER: "What is the annual charge?"

SIR HENRY THORNTON: "That is the total capital expenditure."

MR. GEARY: "For your broadcasting station?"

MR. FRASER: "What did it cost last year?"

SIR HENRY THORNTON: "It cost us last year on operating account \$420,000."

MR. HEAPS: "Is there any return?"

SIR HENRY THORNTON: "The only return is the value we think we get out of it in advertising. There again you have to differentiate between that which you think makes the best return—advertising in periodicals, or newspapers or the radio. This whole question of advertising is not susceptible to any precise formula. It is a matter of judgment. Now, we may make mistakes. I do not mean to say that our advertising policy has by any means been absolutely accurate. We have to try various means and see what the answer is and what the result may be, and this whole exploration of the field of radio was for the purpose of determining to what extent it might be regarded as a useful advertising implement."

### L. N. E. to Try Out Simplified Rate Basis, Without Classifications

As one means of meeting highway competition, the London & North Eastern of Great Britain has proposed a distinct innovation in methods of applying railroad freight tariffs, and has obtained the consent of the British Railway Rates Tribunal to a trial of the new plan between London City freight stations, warehouses and docks, and Chelmsford, Colchester and Ipswich. The new plan, which provides essentially for the abolition of freight classifications and the charging of all traffic solely on the basis of weight loaded per car, regardless of class, is described by the Railway Gazette (London), as follows:

"The London & North Eastern has obtained the assent of the Railway Rates Tribunal to the disregard of the whole of the 21 classes in the general railway classification and to the charging of all traffic in a specified district solely on the basis of weight loaded per car. Thus, the classification of 21 classes, with standard rates ranging from 4s. 6d. to 28s. 10d. per ton, will be replaced by three rates only, irrespective of the nature of the traffic, the rates being: Two tons per car, 11s. (\$2.64) per ton; four tons per car, 8s. 6d. (\$2.04) per ton, and six tons per car, 6s. 6d. (\$1.56) per ton. This proposed scale gives a definite incentive to shippers to increase the average car load, a factor which naturally tends to increased operating efficiency and economy. The district in question was chosen because, although it embodies an important part of London and certain provincial towns, it is fairly self-contained and the experiment can be conducted without serious effect upon the position in surrounding districts. \* \* \* Should this



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**Illinois Steel Company**

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experiment prove satisfactory, it may lead eventually to the supersession of the existing cumbersome classification and the introduction of simplified methods of charging which would greatly reduce railway clerical and accountancy costs. If such an alteration could be coupled with the total repeal of the "undue preference" clauses of the Railway and Canal Traffic act, 1854, the railway companies would be in an infinitely better position to combat road transport competitors who are not subject to such restrictive legislation."

Prior to 1920, British railway merchandise rates were based upon the classification of traffic, including coal, into nine classes, but with a number of "exceptional" commodity rates lower than the appropriate class rates. The complexity of the entire rate structure, demanding revision and simplification, resulted in the drawing up of a new traffic classification, including 21 classes of merchandise, but excluding coal. Standard rates for each of these 21 classes went into effect, following a long series of hearings, on January 1, 1928. The new standard rates failed, however, to eliminate many of the old "exceptional" rates; while the railways, faced, since 1922, with rapidly increasing highway competition, have been forced to quote thousands of new exceptional rates, lower than the standard charges, so that the expected simplification of the rate structure has not materialized. It is partly with this end in view, as well as with the purpose of meeting road competition and increasing the average car load, that the new rate plan is being tried out by the L. N. E.

\* \* \*



National Safety Council's Trophy for A.C.L.

Awarded by the National Safety Council to the Atlantic Coast Line Railroad for the lowest total casualty rate in 1930, in Group B. The record of the Atlantic Coast Line, showing a rate of 1.66 per million man-hours worked, in its record of casualties to employees (on duty) in 1930, was given in the *Railway Age* of April 18, page 769. This was the lowest rate ever shown by any Class I railroad working over fifty million man hours yearly.

## Equipment and Supplies

### LOCOMOTIVES

#### Pennsylvania Orders Mechanical Parts for 90 Electric Locomotives

The Pennsylvania has placed orders at a cost of \$4,700,000 for the material and the construction of the mechanical parts or chassis of 90 of the 150 electric locomotives for which the railroad recently purchased the electrical equipment as reported in the *Railway Age* of May 30. The locomotive parts included in the new order consist of driving wheels, axles, trucks, frames and cabs and the structural parts in which the electrical apparatus will later be installed. The construction and material costs are in addition to the cost of electrical equipment recently ordered.

Of the locomotives included in the new order 54 will be built by the Westinghouse Electric & Manufacturing Company, at Eddystone, Pa.; 25 will be constructed by the General Electric Company, at Erie, and 11 will be built in the Pennsylvania's shops at Altoona.

Locomotive chassis to be built at the Westinghouse locomotive plant will use electric equipment manufactured by that company, and the locomotives to be built by the General Electric Company at Erie, and at the Altoona works of the Pennsylvania, will carry electrical equipment built by the General Electric Company.

Contracts for the installation of this electrical equipment, as well as the application of electric signal cab equipment, will be awarded later.

Deliveries on this order are scheduled to begin not later than December of this year and the entire consignment of 90 locomotives is expected to be ready by June, 1932.

Each locomotive will have a one-piece cast steel main frame or bed. The beds for these and the remaining locomotives in the total present program of 230 units or engines, will be built by the General Steel Castings Corporation in its new plant at Eddystone, Pa.

The passenger locomotives, for which construction orders were placed are known as Class P-5. This type is a heavy duty, high speed, passenger locomotive, 52-ft. 8-in., long and weighing 375,000 lb.; this locomotive has three pairs of 72-in. driving wheels and a four-wheel engine truck at each end. It is composed of three distinct units, a chassis unit, a deck unit and a cab unit, each of which will be completely equipped before the three units are assembled to form a complete locomotive.

The Pennsylvania will use two classes of electric passenger locomotives. They have been designed after a series of elaborate studies covering several years. During the past year four electric locomotives of O-1 type, corresponding in general characteristics of the design to the P-5

locomotive under discussion, have been in operation on passenger trains over the lines already electrified between Wilmington, Del., and Trenton, N. J.

### FREIGHT CARS

THE NORFOLK & WESTERN will rebuild 450 all-steel hopper coal cars at its Roanoke shops.

THE GENERAL AMERICAN TRANSPORTATION SYSTEM, Chicago, has ordered 250 refrigerator cars from the General American Car Company.

THE NORTHWESTERN REFRIGERATOR LINE COMPANY has ordered 220 refrigerator cars from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of June 20.

THE FRUIT GROWERS EXPRESS is contemplating the construction of 800 new refrigerator cars to be built in its shops at Indiana Harbor, Ind. The company is now asking for prices from various manufacturers for the materials which will be needed for the construction of the cars. A contract for the 800 steel underframes for these cars has been given to the Pressed Steel Car Company.

### IRON & STEEL

THE NORFOLK & WESTERN is in the market for 20,000 tons of 130-lb. steel rail with the necessary fastenings.

THE PENNSYLVANIA received bids on June 23 for a limited quantity of structural steel and aluminum cables.

THE LEHIGH VALLEY has given an order to the McClintic-Marshall Corporation for 210 tons of steelwork for a bridge at Cayuta, N. Y.

THE SEABOARD AIR LINE has ordered 3655 tons of rail from the Tennessee Coal, Iron & Railroad Company and 2110 tons from the Bethlehem Steel Company for June delivery, all to be of 100-lb. R. E. section.

### MOTOR COACHES

THE NORFOLK SOUTHERN BUS CORPORATION, subsidiary of the Norfolk Southern, has accepted delivery of one Mack Model BC 29-passenger interstate type motor coach.

THE DENVER, COLORADO SPRINGS-PUEBLO MOTORWAY, INC., subsidiary of the Denver & Rio Grande Western, has accepted delivery of one Mack Model BK 265-in. motor coach chassis.

### MISCELLANEOUS

THE CHESAPEAKE & OHIO will buy a number of tractors and trailers at a cost of about \$35,000 to replace hand trucks on its merchandise piers at Newport News, Va.

Continued on Next Left Hand Page





**W**HEELS are the focal point of safe transportation. Efficient signal systems, necessary as they are, cannot offset inadequate materials in rolling stock. Upon wheels must rest a major share of responsibility.

Carnegie Wrought Steel Wheels have earned an enviable reputation for the efficient manner in which they have shouldered this responsibility for many important railroad systems. To serve even more efficiently, Carnegie Rim-Toughened Wrought Steel Wheels are now

available for all classes of service. The process of heat treatment to which these wheels are subjected insures additional service and additional safety out of all proportion to the small increase in cost.

Carnegie Rim-Toughened Wrought Steel Wheels have the stamina to endure the stress and strain of modern high-speed transportation. Carnegie equipped means speed with safety.. means service with economy. Carnegie

engineers are at your service at all times.

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## Supply Trade

**James A. Ireland**, representative of **Steel & Tubes, Inc.**, Cleveland, Ohio, has been appointed central district sales manager.

**E. E. Griest**, general superintendent of the **Chicago Railway Equipment Company**, has been appointed vice-president in charge of manufacture.

**Harry T. Gilbert**, assistant to the president of the **Republic Steel Corporation**, Youngstown, Ohio, with headquarters at Cleveland, has resigned.

**A. C. Moore**, vice-president of the **Chicago Railway Equipment Company**, was elected executive vice-president at a meeting of the board of directors on June 13.

The **Duntley-Dickinson Company**, 705 Fisher building, Chicago, has been appointed sales representative for the **Burke Electric Company**, Erie, Pa., and will handle railroad sales.

**Charles Wesley McKinley**, assistant chief development engineer of the **AC Spark Plug Company**, Flint, Mich., has been promoted to chief development engineer, to succeed **Joseph Zubaty**, resigned.

**Lukenweld, Inc.**, division of **Lukens Steel Company**, Coatesville, Pa., has appointed **W. R. McDonough & Company** as representative in the Cleveland district, and the **Dravo Doyle Company** as representative in the Pittsburgh territory.

**Charles G. Melvin**, New York sales agent at 230 Park avenue, New York, of the **Griffin Wheel Company**, Chicago, has severed his connection with the company as of July 1, on which date the New York office of the company will be closed. Its business thereafter will be handled from the Chicago office.

**Sterling F. Ashley**, until recently assistant chief draftsman of the New York



Sterling F. Ashley

Central, has been appointed sales engineer of **T. H. Symington & Son, Inc.**,

Baltimore, Md. Mr. Ashley was born on June 2, 1897, at Chatham, N. Y. He attended the public schools of Chatham and in 1916 entered the service of the New York Central in its operating department. In 1917 he was transferred to the equipment engineering department as a draftsman and during successive years was promoted to the positions of leading draftsman, designing engineer and assistant chief draftsman. Mr. Ashley's experience has included the design and construction of new equipment and the maintenance of existing equipment. For the past five years he has also been engaged in research work pertaining to the operation of freight car trucks and truck springs in connection with road tests and investigations conducted by the New York Central test department.

**Roger W. Andrews**, assistant to the president of **The Blaw-Knox Company**, Pittsburgh, Pa., has been appointed vice-president and a director of the **Blaw-Knox International Corporation**. Mr. Andrews will reside in Paris and will be in charge of the company's European activities. He will take the place



Roger W. Andrews

of **C. T. Clack**, who died recently at Dusseldorf, Germany. Prior to Mr. Andrews' association with the Blaw-Knox Company, he operated his own company under the name of the **Andrews-Bradshaw Company**, until January, 1928, when the Andrews-Bradshaw Company was merged with the Blaw-Knox Company and Mr. Andrews was appointed manager of the Tracyfier division of the latter. He held this position until the spring of 1929 when he was appointed assistant to the president.

**Lester A. Blackford**, assistant treasurer of the **American Car & Foundry Company**, New York, was elected treasurer at a special meeting of the board of directors, to succeed **Stanley Andrew Mallette**, deceased. Mr. Blackford was educated in the St. Louis, Mo., public schools and later attended New York University, from which he was graduated with the degree of B. C. S. in 1915. He entered the treasury department of the St. Louis office of the American Car & Foundry Company in February, 1903,

and was transferred with that department to the New York office in May,



Lester A. Blackford

1908. Mr. Blackford was appointed assistant treasurer in July, 1917.

## Construction

**ATCHISON, TOPEKA & SANTA FE.**—A contract has been let to Fairbanks, Morse & Co., Chicago, for the construction of an automatic electric skip hoist type coaling station, a one-track semi-automatic electric cinder conveyor, and sand storage, drying and handling facilities at Hurley, N. M.

**ATCHISON, TOPEKA & SANTA FE.**—This company plans to elevate its tracks for a distance of about 2.5 miles through Oklahoma City, Okla., involving the construction of a new bridge over the South Canadian river and a new passenger station. About 1.25 miles of the elevation will consist of sand fill between reinforced concrete retaining walls which will vary in height from 17 ft. to over 21 ft. above the top of footings, with the remainder sloping down from 17 ft. to 2 or 3 ft. in height. The rest of the elevation will consist of open fill without walls, and the total embankment approximates 560,000 cu. yd. Underpasses under the elevation will be provided at 13 streets and the double track lines of the Chicago, Rock Island & Pacific and the St. Louis-San Francisco. These underpasses will be constructed of concrete-incased steel beam spans on concrete abutments with reinforced concrete column bents at curb lines and center lines of streets. The new bridge over the South Canadian river will consist of seven 106-ft. double track deck girder spans on concrete piers carried down to rock. The substructure for this bridge has already been placed. The present passenger station will be replaced by a new building which will be provided with Fred Harvey lunch and dining room facilities in addition to the usual arrangements for handling passengers, baggage, mail and express. Four station tracks will be served by two platforms about 1,350 ft. in length and provided with umbrella

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type shelters. It is planned to undertake the grading work at once, and as plans for subways and retaining walls are practically complete a contract for that work will be awarded in the near future. Work on the passenger station will be undertaken as soon as plans and specifications are complete.

**CHESAPEAKE & OHIO.**—A contract has been let to Fairbanks, Morse & Co., Chicago, for the construction of two semi-automatic electrically operated two-track cinder conveyors at Walbridge, Ohio.

**COLUMBUS & GREENVILLE.**—This company plans the construction of a new bridge over the Yazoo river at Fort Loring, Miss., near Greenwood, to replace the present structure. Permission for the construction of this bridge is now pending before the War department.

**DELAWARE & HUDSON.**—A bid submitted by DiNella Brothers Company, Pittsburgh, Pa., for the elimination of the Potter crossing of the Delaware & Hudson tracks in Unadilla, N. Y., has been approved as not excessive by the Public Service Commission of New York.

**ERIE.**—The Public Service Commission of New York has approved as not excessive the bid submitted by the Ferguson & Edmondson Company, Pittsburgh, Pa., for the reconstruction of the highway bridge carrying West Main street, Port Jervis, N. Y., over the Erie tracks.

**HOOVER DAM.**—Six Companies, Inc., Boulder City, Nev., general contractor on the construction of the Hoover Dam on the Colorado river, has awarded a contract to the J. Phillips Company, San Francisco, Cal., for the grading for the construction of 16 miles of construction railroad at the dam site.

**ILLINOIS TERMINAL.**—A contract for the construction of the superstructure of a 17-story basement and sub-basement terminal and office building at St. Louis, Mo., has been awarded to the Selden-Breck Construction Company, St. Louis, at a cost of about \$1,000,000. The total cost of this project will be about \$5,000,000.

**LEHIGH VALLEY.**—The New York Public Service Commission has approved a bid submitted by John J. Higgins, Waverly, N. Y., for work in connection with the elimination of the Decker crossing of this company's tracks in Cayuta, N. Y. The bid of the McClintic-Marshall Company, New York City, for furnishing and delivering the structural steel for the elimination was also approved.

**LOUISVILLE & NASHVILLE.**—A contract has been let to the American Bridge Company, Chicago, for the construction of the superstructure of the river spans of this railroad's new bridge over the Ohio river at Henderson, Ky. The bridge proper will consist of four spans, each 500 ft. in length and one channel span 675 ft. in length. The contract with the American Bridge Company also involves the construction of the approach on the Indiana side of the river. The Virginia

Bridge & Iron Company, Roanoke, Va., has been awarded a contract for the construction of the approach on the Kentucky side of the River.

**NEW YORK CENTRAL.**—The Public Service Commission of New York has approved as not excessive two bids submitted by the Walsh Construction Company, Syracuse, N. Y., for the elimination of a grade crossing of this company's tracks at Main street, Savannah, N. Y., and for the grading of the Peat Street yards in connection with the New York Central's general program of grade separation and terminal improvements in Syracuse. The commission has also added to the list of crossings to be considered for elimination during 1931 one located on the Pattersonville-Rynex Corners highway, near Pattersonville station, Rotterdam, N. Y., and has ordered the reconstruction of the bridge carrying the Croton River-Peekskill county highway over the New York Central tracks in Cortlandt, N. Y.

**NORFOLK & WESTERN.**—To permit the handling of heavier equipment and trains and to increase operating efficiency generally over its North Carolina Extension, this company has started work on strengthening and rebuilding 15 bridges on that line. The project, on which the railroad is using about 200 of its own employees, is expected to be completed within a year. Steel for the work is being furnished and erected by the Virginia Bridge & Iron Company, Roanoke, Va.

**PANHANDLE & SANTA FE.**—A contract has been let to D. N. Leaverton, Lubbock, Tex., for the construction of a one-story brick combined freight and passenger station at Littlefield, Tex.

**PENNSYLVANIA.**—A contract for the masonry work for the construction of 23 new street subways for the elevation of the Englewood Connecting Railway between Hamilton and Stewart avenues, Chicago, has been awarded to the Underground Construction Company, Chicago.

**TEXAS & PACIFIC NORTHERN.**—A recommendation that this company, a subsidiary of the Texas & Pacific, be authorized by the Interstate Commerce Commission to build only 126 miles of its proposed 328-mile line in the Texas Panhandle district, is made in a proposed report by Examiner O. D. Weed. The examiner says that the commission should issue a certificate authorizing a line from Big Spring to Brownfield, Tex., 80 miles, and from Lubbock Junction to Lubbock, 46 miles, but should find that public convenience and necessity have not been shown to require that part of the proposed line from Brownfield northerly to a point 2 miles beyond Vega and from Dimmitt to Amarillo. Construction of the line was opposed by the Panhandle & Santa Fe, the Rock Island, the Fort Worth & Denver City and the Fort Worth & Denver South Plains, on the ground that the existing railways are furnishing the district all the service required and have capacity for three or four times as much business as they are now doing, while trucks are also taking an increasing share of the traffic

"Notwithstanding the objections to the present construction of the entire line as sought," the examiner says, "it is not improbable that a line along this general route may become reasonably necessary after there has been sufficient further development of the territory in question. Since such construction north of Brownfield is not thought to be justified on the present record, it would seem better not to prejudice the matter and compromise the future, especially in view of the rapid extension of highway transport and the intense rivalry between the railroads and the motor transport companies, the results of which may be much clearer within a few years."

**WESTERN PACIFIC CALIFORNIA.**—The Interstate Commerce Commission has granted this company an extension of time from July 1 to January 1, 1932, for the beginning and from July 1, 1933, to January 1, 1934, for the completion of the construction of the proposed line from Niles to San Francisco, Cal., under the certificate issued by the commission. Time was asked for further negotiations with the Southern Pacific as to trackage rights, which would reduce the amount of new construction.

## Financial

**CHARLESTON & WESTERN CAROLINA.**—*Bonds.*—The Interstate Commerce Commission has authorized this company to procure the authentication and delivery of \$53,000 of its first consolidated mortgage, series B, 50-year coupon bonds in reimbursement of capital expenditures.

**CHICAGO, INDIANAPOLIS & LOUISVILLE.**—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to conditionally issue \$467,000 of first and general mortgage 6 per cent bonds, to be pledged as security for notes.

**CHICAGO, ROCK ISLAND & PACIFIC.**—*Acquisition.*—The Interstate Commerce Commission has authorized this road to acquire by lease the line of the St. Paul & Kansas City Short Line now under construction from Coburn to Birmingham, Mo., 71.45 miles. The line will afford the Rock Island a new short route between Chicago and St. Louis.

**DENVER & RIO GRANDE WESTERN.**—*Abandonment.*—This company has been authorized by the Interstate Commerce Commission to abandon its La Madera branch, a narrow-gauge line extending from Taos Junction to La Madera, New Mexico, 16.43 miles. The certificate was issued on condition that the D. & R.G.W. within 30 days after the order would be willing to lease the branch or any portion of it to any applicant at a rental not less than 6 per cent upon the fair net salvage value of the branch.

**DULUTH, SOUTH SHORE & ATLANTIC.**—*Assumption of Liability for Bonds.*—This company and the Marquette, Houghton & Ontonagon have been authorized by the

Interstate Commerce Commission to execute a lease with the South Shore Dock Company at Marquette, Mich., of a re-inforced concrete dock which is to be constructed at an estimated cost of \$1,350,000, the D.S.S. & A. to assume liability for \$1,000,000 of first mortgage 5 per cent bonds of the Dock Company.

**GREAT NORTHERN.—Reduced Dividend.**—The directors of this company have declared a semi-annual dividend of \$1.50 on preferred stock. The previous semi-annual dividend for this year was for \$2.50, so that the present action places the stock on a \$4.00 annual basis. The stock has been maintained on a \$5.00 annual basis since 1923.

**INDIANAPOLIS UNION.—Bonds.**—This company has applied to the Interstate Commerce Commission for authority to issue and sell \$1,000,000 of refunding and improvement mortgage 4½ per cent bonds, and the Pennsylvania, New York Central and Cleveland, Cincinnati, Chicago & St. Louis have asked authority to guarantee the bonds.

**KENTUCKY & INDIANA TERMINAL.—Bonds.**—This company has been authorized by the Interstate Commerce Commission to procure the authentication and delivery of not exceeding \$851,000 of its first mortgage 4½ per cent bonds in reimbursement for capital expenditures.

**MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—Abandonment.**—The Interstate Commerce Commission has authorized this company to abandon its Knox branch extending from Brantwood, Wis., to Knox Mills, 4.9 miles.

**NEW YORK CENTRAL.—Equipment Trust Certificates.**—The Interstate Commerce Commission has granted authority to this road to assume obligation and liability in respect of not exceeding \$3,094,000 of 4½ per cent equipment trust certificates to be issued by the Guaranty Trust Company of New York, trustee, under an agreement dated May 15, 1930, to be sold at not less than 104.4121 per cent of par and accrued dividends.

**NORTH PLAINS & SANTA FE.—Bond.**—This company has applied to the Interstate Commerce Commission for authority to issue one first mortgage bond for \$4,000,000 to be delivered to the Atchison, Topeka & Santa Fe in satisfaction of indebtedness for advances.

**PENNSYLVANIA.—Abandonment.**—The Interstate Commerce Commission has authorized this company and the West Jersey & Seashore to abandon that part of the latter company's Medford branch from a point near Haddonfield, N. J., to a connection with the Mt. Holly and Medford branch of the Camden & Burlington, approximately 11 miles.

**PENNSYLVANIA.—Abandonment.**—The case in which the Pennsylvania & Atlantic is seeking authority to abandon its Island Heights branch, extending from Pine Beach to Island Heights, N. J., 1.2 miles, has been held open by the Interstate Commerce Commission pending determination

of the results of discontinued operation on the branch for an experimental period. This decision is in accord with a recent order of the Board of Public Utilities Commissioners of New Jersey in the same case.

**PENNSYLVANIA.—New Directors.**—Joseph Wayne, Jr., president and director of the Philadelphia National Bank, has been elected a member of the board of directors of the above company, to fill the vacancy caused by the recent death of Charles Day. Frederic C. Dumaine, of Boston, Mass., has been elected a director of this road to succeed Levi L. Rue, deceased. Mr. Dumaine, who is also a director of the New York, New Haven & Hartford, is a trustee and treasurer of the Amoskeag Manufacturing Co., Boston, and president and treasurer of the Waltham Watch Co.

**PENNSYLVANIA.—Dividend Reduced.**—Directors of this road on June 24 declared a quarterly dividend of 1½ per cent (75 cents) per share, representing a reduction from the previous quarterly rate of \$1 per share, which had been paid since May 1929. President W. W. Atterbury stated that the reduced current earnings would call for an even greater reduction in the dividend, but the Board of Directors were convinced that the recent measures of international cooperation initiated by President Hoover were of such fundamental importance as to justify, partly out of surplus, a dividend disbursement reflecting the confidence of the Board in future improvement.

**ST. LOUIS-SAN FRANCISCO.—Bonds.**—The Chase Securities Corporation and Dillon, Read & Co. will purchase \$10,000,000 five-year 6 per cent consolidated series B bonds of this company, subject to the approval of the Interstate Commerce Commission. The new issue is for the purpose of meeting a maturity of \$9,342,000 of general mortgage bonds due July 1.

**WABASH.—Notes.**—The Interstate Commerce Commission has authorized this company to issue \$368,909 of first lien 50-year 4 per cent terminal bonds to be pledged and repledged as collateral security for short term notes.

#### Average Prices of Stocks and of Bonds

	June 23	Last week	Last year
Average price of 20 representative railway stocks..	70.13	68.91	110.33
Average price of 20 representative railway bonds..	91.23	90.87	93.89

#### Dividends Declared

Baltimore & Ohio.—Common, 1¼ per cent, quarterly; Preferred, 1 per cent, quarterly, both payable September 1 to holders of record July 18.

Chicago Great Western.—Preferred, 50c, payable July 20 to holders of record June 25.

Delaware & Hudson.—\$2.25, quarterly, payable September 20 to holders of record August 28.

Great Northern.—Preferred, 1½ per cent, payable August 1 to holders of record June 30.

Kansas City Southern.—Common, 50c, quarterly, payable August 1 to holders of record June 30; Preferred, \$1.00, quarterly, payable July 15 to holders of record June 30.

Pennsylvania.—75c, quarterly, payable August 31 to holders of record August 1.

Pennroad Corporation.—20c, payable September 15 to holders of record August 14.

## Railway Officers

### EXECUTIVE

**Frank W. Grace**, general manager of the Missouri-Kansas-Texas Lines, has been elected vice-president and general manager, with headquarters as before at Dallas, Tex.

### FINANCIAL, LEGAL AND ACCOUNTING

**J. R. Barrett**, chief clerk to the auditor of freight accounts of the St. Louis Southwestern, has been promoted to auditor of freight accounts, with headquarters at St. Louis, Mo., succeeding **S. W. Greaves**, deceased.

### OPERATING

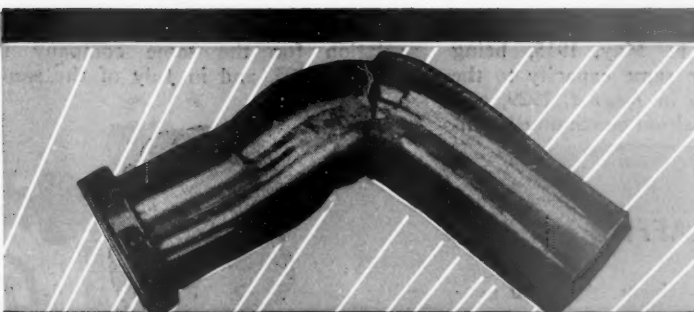
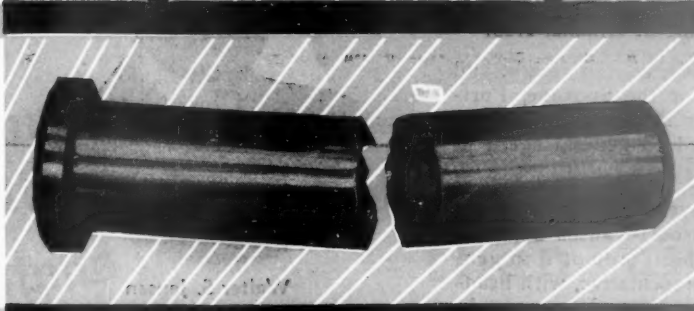
**M. J. Flanigan**, manager of the safety department of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Chicago, has also been appointed manager of the fuel department of that railroad.

**R. Colclough**, who will retire as superintendent of the Saguenay division of the Canadian National on July 1, was born at Bic, Que. He commenced his railroad career with the Intercolonial (now part of the C. N. R.), at Moncton in 1889, and, after occupying various clerical positions, was appointed assistant superintendent. He became superintendent of the Montreal and St. Flavie division of the Transcontinental (now part of the C. N. R.) at Levis, in 1913, and in 1916 was transferred in the same capacity to the Quebec and O'Brien division. In 1920 he was appointed superintendent of the Quebec and Lake St. John and Quebec and Saguenay divisions of the Canadian National, with headquarters at Quebec. Mr. Colclough was also a member of the Canadian Government Railways Provident Fund, having been identified with that organization since the beginning of his railroad career.

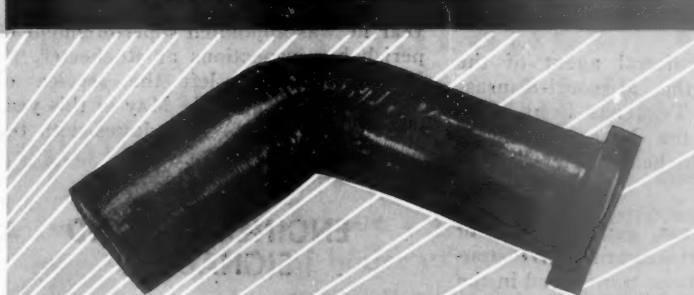
**William Beall Way**, who will retire as superintendent of the Canadian National at Allandale, Ont., on July 1, was born at Bowmanville, Ont., on August 22, 1867. He began his railroad career in September, 1884, as telegrapher and agent for the Canadian Pacific. In February, 1888, he became despatcher for the same road at Algoma, Ont., and the following year he was promoted to chief despatcher for that company at White River, Ont. He became trainmaster and assistant superintendent in November, 1906, and in February, 1913, was promoted to the position of superintendent at Farnham, Que. In May of the following year he was appointed inspector of transportation at Montreal. Mr. Way entered the service of the

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**WROUGHT IRON****STEEL****AGATHON NICKEL IRON**

These pins all have the same surface hardness and case depth. They were tested on a V-block under a steam hammer. Note toughness of Agathon Nickel Iron.



## Are Your Pins Tough or Brittle?

- How well equipped are your spring and brake rigging pins to withstand sudden shocks and extreme loads?
- Such pins, of course, have a hard surface to resist wear. But underneath this surface they should be tough, not brittle.
- Agathon Nickel Iron has a reputation for toughness. Observe the test illustrated above and note the toughness of the Agathon Nickel Iron under repeated hammer blows.
- This modern alloy iron is ideal for all case-hardened work. There are no slag spots or seams, and warping is almost negligible. Grinding is unnecessary and the finished cost with Agathon Nickel Iron is lower. Use it for all case-hardened pins and bushings.

**CENTRAL ALLOY DIVISION**  
**REPUBLIC STEEL**  
**CORPORATION**

Massillon, Ohio



Canadian National as superintendent at Cochrane, Ont., in May, 1915, being transferred in the same capacity to the Allandale division in August, 1929, and serving in that position continuously until his retirement.

## TRAFFIC

**A. G. Bloom** has been appointed general agent of the passenger department of the Union Pacific at Omaha, Neb.

**Harry W. Shields**, district freight and passenger agent for the Spokane, Portland & Seattle at San Francisco, Cal., has been promoted to general agent at the same point.

**Walter L. Meyers**, division freight agent for the Missouri-Kansas-Texas at Tulsa, Okla., has been promoted to general petroleum representative, with headquarters at the same point, a newly created position.

**R. Reece**, agricultural agent of the Texas lines of the Missouri-Kansas-Texas at Dallas, Tex., has been given jurisdiction over the Missouri-Kansas-Texas system, with headquarters as before at Dallas.

**R. A. Pendergrass**, general agent of the St. Louis Southwestern at Winston-Salem, N. C., has been transferred in the same capacity to Nashville, Tenn., replacing **T. G. King**, transferred. Mr. Pendergrass will be succeeded by **A. H. Merck**.

**W. H. O'Donnell**, steamship and passenger agent of the Canadian National at Montreal, retired from the service of that company on June 15. He was succeeded by **E. C. Kennedy**, district passenger agent at Cincinnati, Ohio, whose former position has been abolished.

**M. L. Harris**, general passenger agent of the Maine Central with headquarters at Portland, Me., has been granted an extended leave of absence on account of ill health. **Joseph J. Doane**, assistant to the general passenger agent at the same point, has been appointed acting general passenger agent, replacing Mr. Harris. **William E. Lucey** has been appointed assistant general passenger agent, with headquarters at Portland.

**Walter S. Jensen**, who has been appointed manager of perishable traffic for the New York Central Lines, with headquarters at Rochester, N. Y., was born in Chicago, on November 12, 1890. He was educated at the University of Wisconsin College of Agriculture, from which he was graduated in 1915. He began his career with the New York Central in September, 1917, as fruit and vegetable inspector in the various loading territories and at the principal delivery points on that system. In July, 1923, he was appointed district agent of Merchants Despatch, Incorporated, at New York City, with jurisdiction over local refrigerator car line activities and inspection service. He became assistant

to the general superintendent of transportation for the same company in January, 1925, and in July of the same



Walter S. Jensen

year he was appointed superintendent of perishable inspections at Rochester, N. Y. Mr. Jensen left the service of Merchants Despatch in May of this year to take over his present duties with the New York Central.

## ENGINEERING AND SIGNALING

**J. P. Head**, assistant district engineer of the South Texas district of the Missouri-Kansas-Texas, with headquarters at Waco, Tex., has retired from active service under the pension rules of the company.

**Heron Cabrera**, who has been promoted to succeed **Aurelio Chavez**, deceased, as chief engineer of the National of Mexico, with headquarters at Mexico, D. F., was born at Leon, Gto., in September, 1885, and graduated from the National Engineers School in 1907. For the following three years he was engaged in the practice of civil engineering under a consulting engineer on the loca-



Heron Cabrera

tion of the Rio Frio Railroad and on various construction projects, including drainage work at Morelia, Micho. Mr.

Cabrera obtained his first experience with the National of Mexico in February, 1910, as assistant to the resident construction engineer. Shortly after this service he acted as a member of the United States-Mexico boundary commission, returning to railway service in the

National of Mexico at Aguascalientes, Ags. Later he was transferred to San Luis Potosi, S.L.P., where he remained until September, 1916, when he was appointed assistant to the chief engineer, maintenance of way and structures. From 1917 to 1920 he served as assistant superintendent of the Aguila Oil Company and as inspector of natural products of the Mexican department of industry and commerce in Yucatan and Lower California, and was engaged in private irrigation and drainage projects. In January, 1921, he was placed in charge of the demarcation committee of the National of Mexico at the Port of Tampico, which included jurisdiction over water supply and the wharves and lands of the railroad at that point. Nine years later he was appointed engineer in charge of right of way of the National of Mexico, with headquarters at Mexico City, a position he held until his promotion to chief engineer.

## MOTOR TRANSPORT

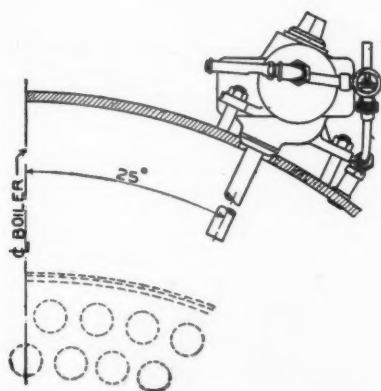
**H. R. Moore, Jr.**, general traffic manager of the Southwestern Transportation Company, a subsidiary of the St. Louis Southwestern, with headquarters at Texarkana, Tex., has been promoted to vice president, with the same headquarters, succeeding **D. W. Russell**, vice president and general manager, who has resigned to enter the motor coach and truck division of Dodge Bros., Inc., Detroit, Mich. **L. R. Reagan**, assistant to the vice president and general manager, has been promoted to general manager, with headquarters at Texarkana.

## MECHANICAL

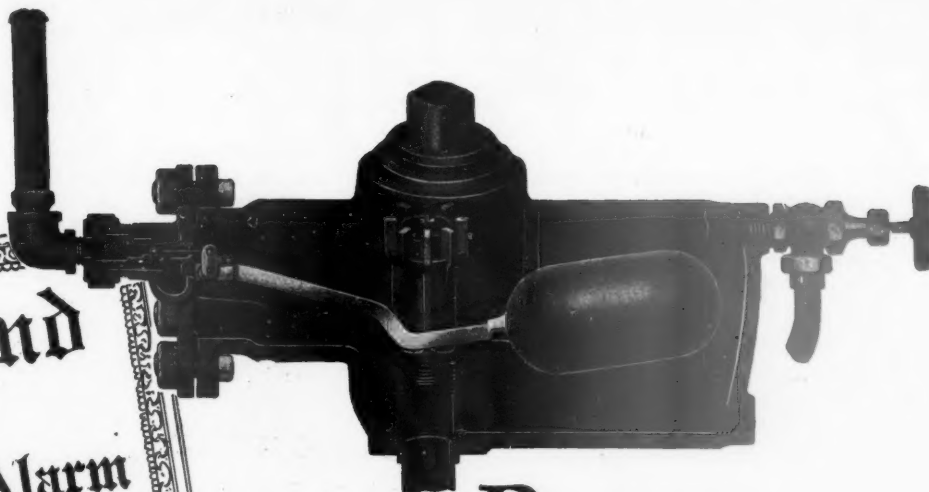
The jurisdiction of **C. S. Branch**, master mechanic of the Northern and Southern divisions of the Chicago & Alton, with headquarters at Bloomington, Ill., has been extended to include the Western division. **G. W. Ray**, master mechanic of the Western division, has been appointed assistant master mechanic of the same division, with headquarters as before at Slater, Mo., and the position of master mechanic of that division was abolished on June 16.

**H. W. Reinhardt**, who has been promoted to superintendent of motive power and equipment of the Chicago Great Western, with headquarters at Oelwein, Iowa, has been engaged in railway mechanical work for more than 23 years. He obtained his first mechanical training on the Chicago, Rock Island & Pacific at Horton, Kan. After completing his apprenticeship on July 5, 1908, Mr. Reinhardt served as a machinist on various railroads, including the Missouri Pacific. From August, 1912, to December, 1923, he was advanced successively on the Missouri





Designed and built to protect lives and property and to assist the crew in operating at maximum efficiency without entailing adjustment or explanation.



## Better than any Insurance Policy that could be written

**I**N the first place no company would issue a policy guaranteeing prevention of boiler explosions.

Secondly, the premiums on a policy covering destruction of property and loss of life would be prohibitive.

The CLEVELAND Float Low Water Alarm provides absolute protection against boiler explosions caused by low water.

The entire cost of application amounts to *less than two tenths of one per cent* of the cost of a modern locomotive.

Figured on an annual basis the cost of CLEVELAND Float Low Water Alarm protection amounts to only a few dollars per locomotive.

*Why take chances when protection is available at such low cost?*

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# BARCO

Pacific through the positions of gang, roundhouse and general foreman at Falls City, Neb., division foreman at Omaha, Neb., gang foreman at Texarkana, Ark., general foreman at Paragould, Ark., and general roundhouse foreman at North Little Rock, Ark. He was then promoted to master mechanic at Crane, Mo., and was transferred to Poplar Bluff, Mo.,



H. W. Reinhardt

in February, 1924; to Monroe, La., in January, 1926, and to Little Rock, Ark., in September, 1926. Mr. Reinhardt was appointed assistant superintendent of motive power and equipment of the Great Western at Oelwein in March, 1931, and his promotion to superintendent of motive power and equipment became effective on May 1.

### PURCHASES AND STORES

**C. H. Murrin**, who has been appointed general storekeeper of the Louisville, & Nashville, with headquarters at Louisville, Ky., has been engaged in railway stores work for nearly 20 years. He en-



C. H. Murrin

tered railway service in 1904 in the mechanical department of the Chicago, Rock Island & Pacific at Silvis, Ill. A year later he was transferred to the stores department and in 1907 he became connected with the stores department of the Chicago & Eastern Illinois at Danville, Ill. In 1910 Mr. Murrin was promoted to general storekeeper of the C. & E. I., where

he remained until 1913, when he began five years in industrial work, the principal portion of which was devoted to purchasing and production activities with the Amalgamated Machinery Corporation at Chicago. During federal control of the railroads he was an inspector with the United States Railroad Administration, Department of Materials and Supplies, and in October, 1923, he entered the service of the Illinois Central, where he served as special accountant assigned to the stores department. His appointment as general storekeeper of the Louisville & Nashville became effective on June 15.

### OBITUARY

**Frank S. Stevens**, former engineer maintenance of way of the Reading, died on May 26. Mr. Stevens, who was 80 years of age, retired from active service in 1923, having previously served for 13 years as engineer maintenance of way for the Reading.

**Samuel W. Greaves**, auditor of freight accounts of the St. Louis Southwestern, with headquarters at St. Louis, Mo., died at St. Luke's hospital in that city on June 18, after an illness of four weeks. Mr. Greaves was 64 years of age and had been in the service of the Cotton Belt for 40 years.

**P. A. Bonebrake**, who served as division superintendent on the Pennsylvania at Louisville, Ky., Indianapolis, Ind., Logansport, Ind., Pittsburgh, Pa., and Columbus, Ohio, at various times from 1894 to 1912, died at Logansport, Ind., on June 8 at the age of 79 years. He had been in the service of the Pennsylvania for more than 43 years.

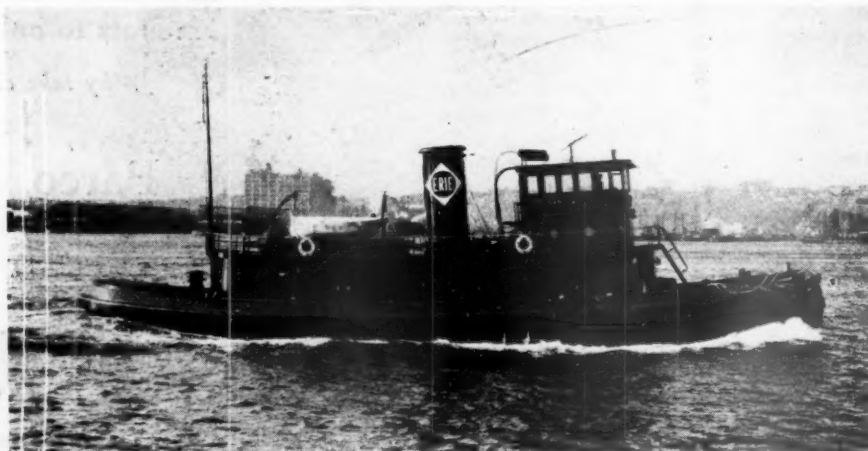
**John C. V. Christensen**, design engineer for the Cincinnati Union Terminal Company, with headquarters at Cincinnati, Ohio, died at Ocean Grove, N. J., on June 16. Mr. Christensen, who was a native of Denmark, had previously served as designing engineer for the Gulf, Florida & Alabama (now part of the St. Louis-San Francisco), at Pensacola, Fla., and had been engaged in the

design of the New York Central passenger station at Buffalo, N. Y.

**Ernest V. Williams**, superintendent of motive power of the Buffalo, Rochester & Pittsburgh at Du Bois, Pa., who died on June 14, was born at Vincennes, Ind., in September, 1870. He began his career with the Brooks Locomotive Works at Dunkirk, N. Y., in 1891. Until 1917 he served consecutively with the Rome Locomotive Works (Rome, N. Y.) as machinist, assistant machine shop foreman, and assistant to the shop superintendent at West Albany, N. Y., and with the New York Central & Hudson River (now part of the New York Central), as machine shop foreman, assistant general foreman and general foreman. From June, 1917, to May, 1920, Mr. Williams was shop superintendent on the Buffalo, Rochester & Pittsburgh. On the latter date he was promoted to superintendent of motive power for the same road at Du Bois, Pa., which position he held at the time of his death.

**Arthur Vernon Brown**, who retired as general manager of the lines of the Northern Pacific west of Paradise, Mont., with headquarters at Seattle, Wash., on July 15, 1929, died in the latter city on June 13, following a brain operation which was preceded by a stroke of apoplexy. He was born on June 5, 1866, at Hannibal, Mo., and obtained his first railroad experience in June, 1884, as a clerk in a joint freight station of the Missouri-Kansas-Texas and the Wabash. After filling various clerical positions on the Katy, the Missouri Pacific, the St. Louis, Iron Mountain & Southern (now part of the Missouri Pacific), and the Chicago, Burlington & Quincy, Mr. Brown was advanced to division superintendent on the Burlington at Hannibal. From 1908 until his retirement he served successively as general manager of the Missouri & North Arkansas at Eureka Springs, Ark., division superintendent on the Northern Pacific at Livingston, Mont., general superintendent of that road at Livingston and at Tacoma, Wash., and general manager of the Northern Pacific's lines west of Paradise.

\* \* \* \*



The "Olean," One of Four New 1,000-hp. Diesel-Electric Tugs Recently Placed in Service in New York Harbor by the Erie



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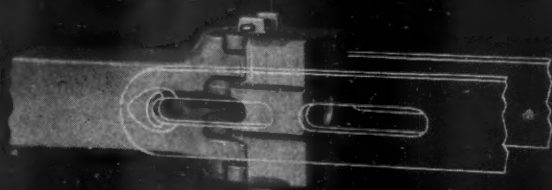
JUNE 27, 1931

# Railway Age

FOUNDED IN 1856

## THE SWIVEL BUTT COUPLER

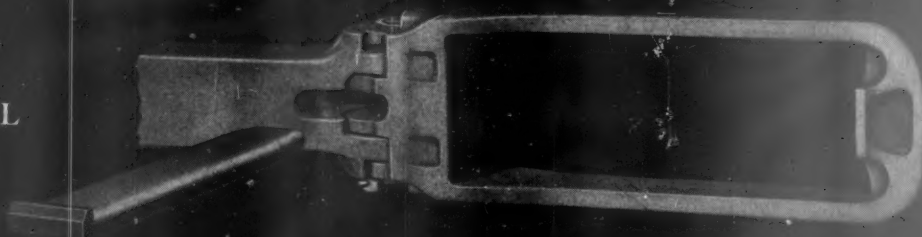
FOR  
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THE  
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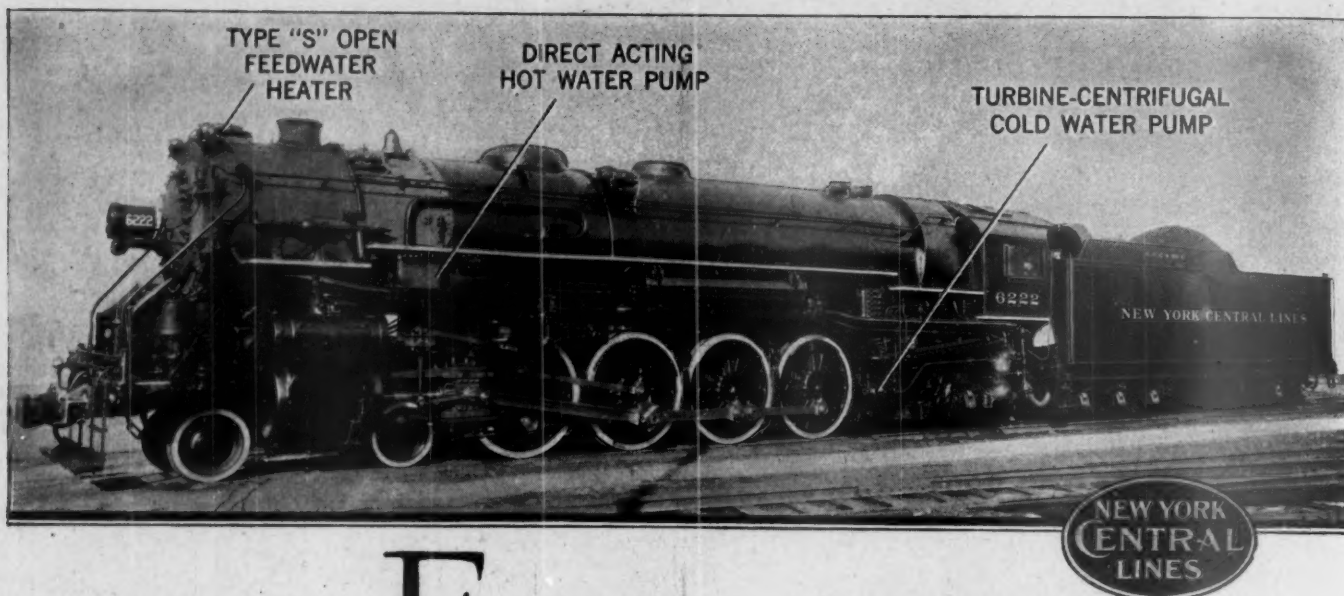


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SWIVEL SHANK, BUTT AND YOKE CAN BE PURCHASED  
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## Feeding Fast Freights on the Big Four Route . . .

### Worthington Feedwater Heating Equipment

THREE years ago, the Cleveland, Cincinnati, Chicago & St. Louis Railway . . . one of the great New York Central Lines . . . installed a Worthington Open Type Feedwater Heater on a locomotive pulling fast freight into Chicago. Freight on the Big Four Route, rolling between Chicago, Cincinnati, St. Louis and other cities, moves on a fast schedule . . . and methods of maintaining or improving locomotive operation are of vital interest to this road.

A year later they installed ten more Worthington heaters on fast freight locomotives, indicating that the Big Four obtained results . . . a saving in fuel and water . . . an increase in steaming capacity and power . . . a reduction in the accumulation of boiler scale.

Now . . . ten new Hudson type passenger locomotives are being Worthington-equipped, for such fast trains as the Ohio State Limited and the Southwestern Limited.

The Big Four has proved Worthington's claims. May we tell *you* the full story of Worthington Feedwater Heating Equipment accomplishments? *Ask for Bulletin W-220-B-2.*

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**PUMPS**  
All Sizes... All Types  
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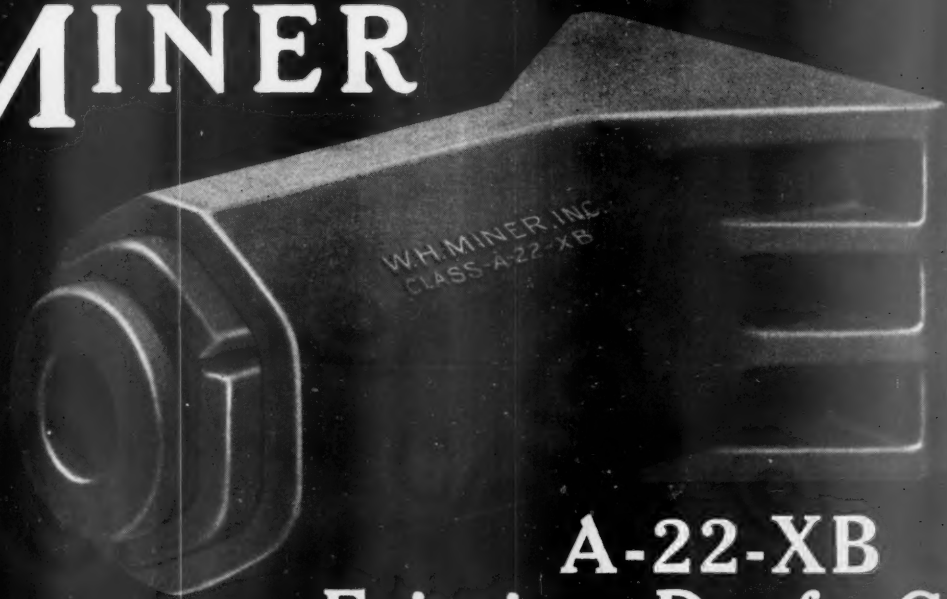
**CHROMIUM PLATING**

*Literature on request*

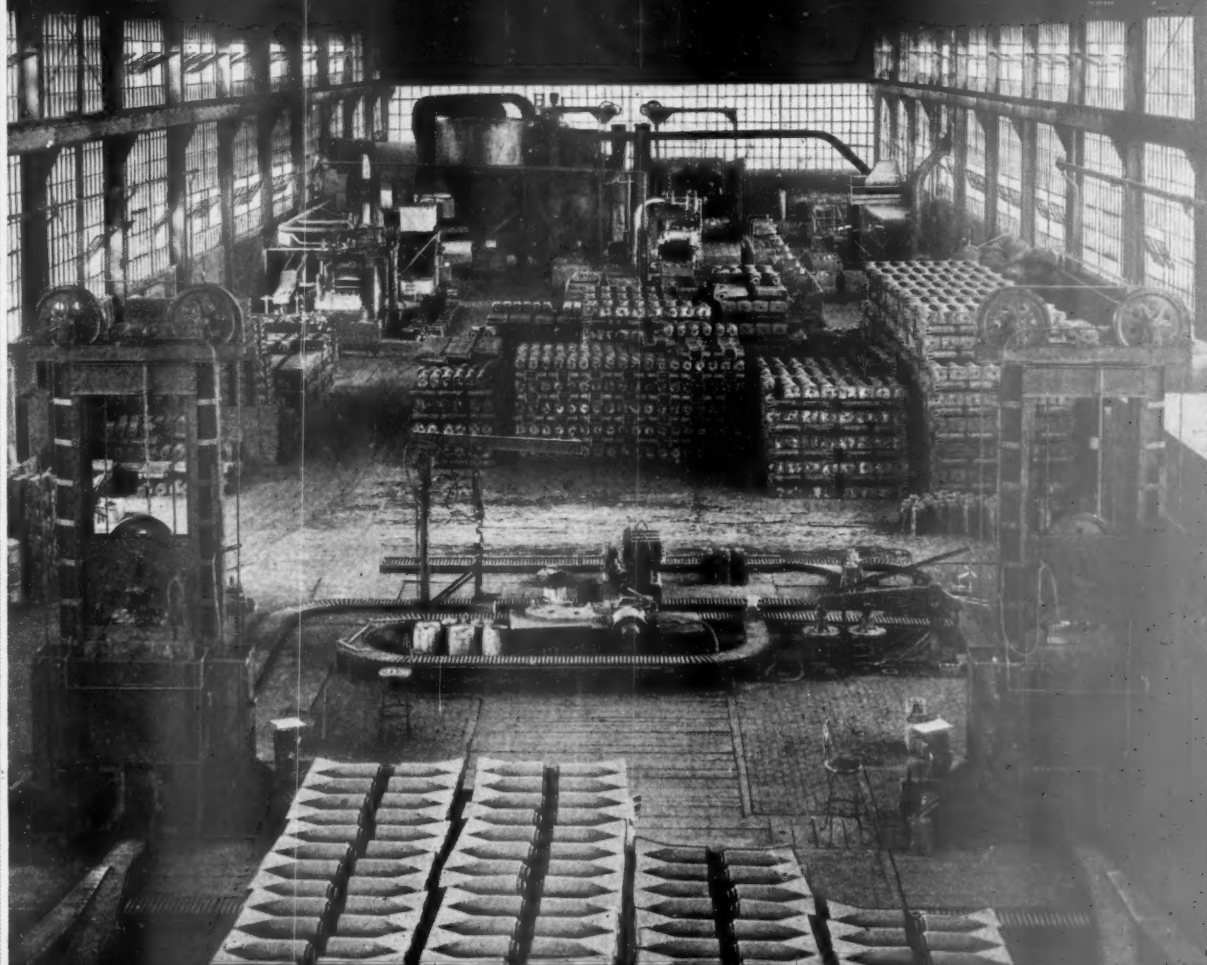
# WORTHINGTON



# MINER



## A-22-XB Friction Draft Gear



### W. H. MINER, INC. CHICAGO



## Helping Erect the West's Largest Bridge

California's historic old train ferries, Solano and Contra Costa, are being retired. So ends one of the fascinating phases of western travel which survived for half a century but has now become too slow. In their place stands a monumental example of engineering and construction progress, the new Southern Pacific railroad bridge across Suisun Bay.

Forty-four million pounds of steel were required in the vast superstructure of this bridge. Erecting this steel was a difficult task and several Industrial Brownhoist heavy-duty erection

cranes were used by the American Bridge Company on the work. The structure was completed in record time and six weeks ahead of schedule.

Greater speed at lower cost is the need today and nowhere is this more essential than in the handling of materials. Thousands of owners will tell you that an Industrial Brownhoist locomotive or crawler crane is the best answer to this challenge. You can determine this for yourself by letting our representative show you some of these cranes at work. The time spent will be well repaid.

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Plants: Brownhoist Division, Cleveland; Industrial Division, Bay City, Michigan; Elyria Foundry Division, Elyria, Ohio.

# INDUSTRIAL BROWNHOIST





# DRAFT GEAR

not heretofore possible " " " " " " " " " " " "

» » » *and the accurately rolled  
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Repeated tests have demonstrated the unequalled uniformity of action—the high capacity and endurance ratings of the Edgewater Ring Spring Draft Gear—the lubricated rolled alloy steel rings—the rugged, sturdy, construction—and master workmanship—all combine to give to this better draft gear the ability to withstand the most severe service tests.

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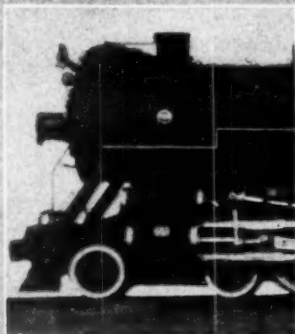
Seattle, Wash.  
Washington, D. C.  
New York, N. Y.



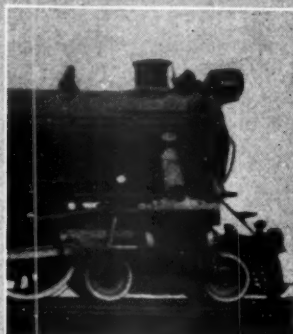
# Many leading railroads



New York Central R. R.



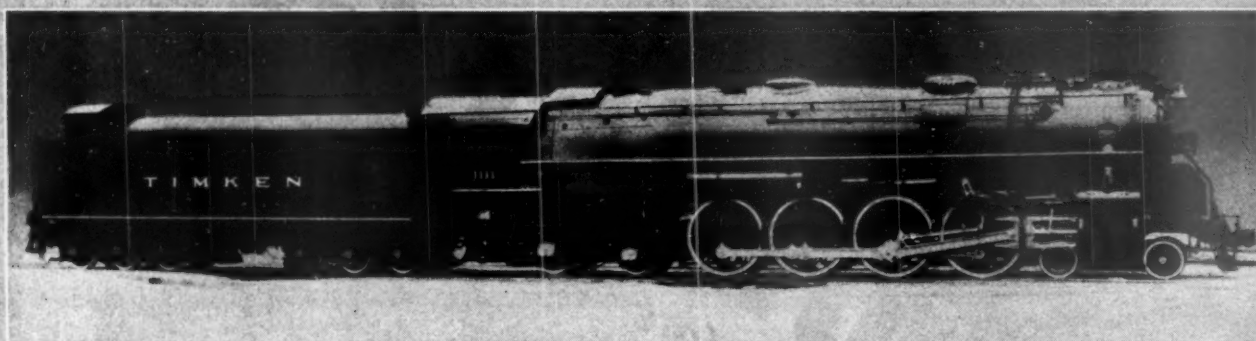
Chicago, Burlington &  
Quincy R. R.



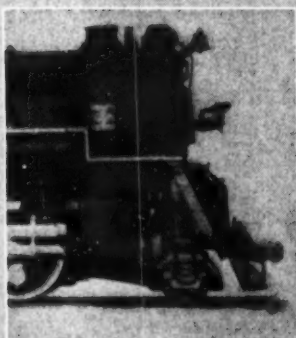
Pennsylvania R. R.



The St. Louis Southwestern  
R. R. (Cotton Belt Route).



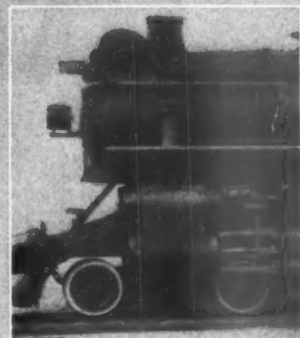
The Timken roller bearing locomotive has Timken engine truck and Timken-equipped drivers, booster, trailer truck and tender trucks.



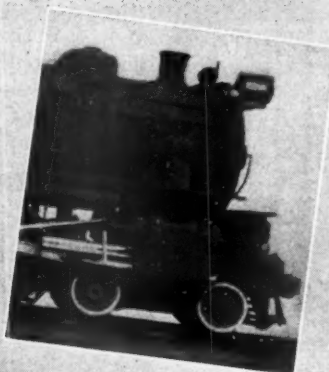
Chesapeake &  
Ohio R. R.

Chicago, Indianapolis  
& Louisville R. R.  
(Monon Route)

International Railway  
of Central America.



Canadian Pacific  
R. R.





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**T**IMKEN roller bearing engine trucks are now being used on a large number of prominent railroads.

Increased reliability of locomotive service with lower operating and maintenance costs are the big advantages which they make possible.

These benefits are the results of freedom from hot boxes, hot hubs and heat checks on hubs; elimination of wear on axles, hubs and housings; saving of lubricant and lubrication time; and Timkens' ability to carry all radial, thrust and combined loads.

Additional economies are effected by the use of standard A.R.A. tender wheels instead of the special thrust-hub wheels used on the ordinary type of engine truck, and by the extension of engine truck shopping periods.

Increasing center plate loads are making Timken engine trucks more and more desirable. Are you familiar with Timken engine truck design? If not, write for full information and prints. Timken engine trucks can be applied to existing motive power.

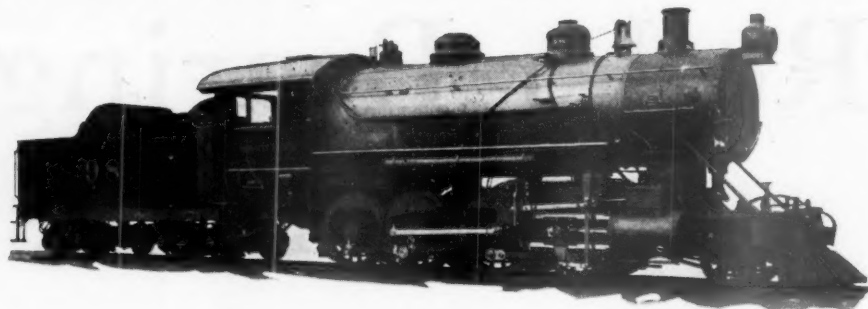
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

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# **TIMKEN** *Tapered Roller* **BEARINGS**

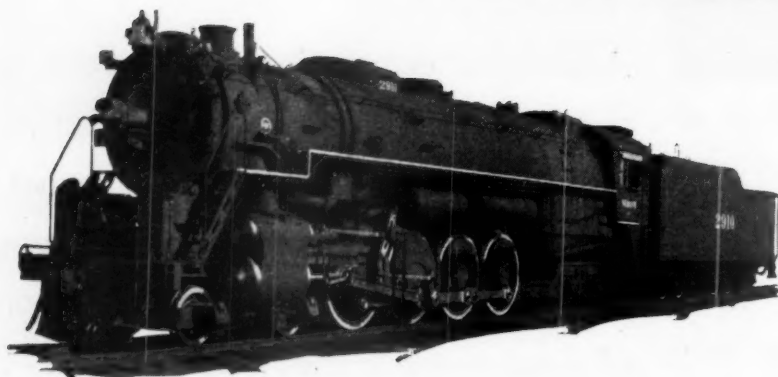
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# AN URGENT QUESTION— MOTIVE POWER MODERNIZATION



THE FREIGHT HAULER OF  
TWENTY-FIVE YEARS AGO

Cylinders	2-8-0 Type	22" x 30"
Drivers, diameter		63"
Steam pressure		200 lb.
Grate area		49.5 sq. ft.
Heating surface		2916.8 sq. ft.
Weight on drivers		181,550 lb.
Weight, total engine		204,900 lb.
Tractive force		39,300 lb.



TODAY'S STRICTLY MODERN  
POWER REDUCES OPERATING  
COSTS

Cylinders	4-8-4 Type	27" x 32"
Drivers, diameter		70"
Steam pressure		250 lb.
Grate area		96.2 sq. ft.
Water heating surface		5189 sq. ft.
Superheating surface		2360 sq. ft.
Weight on drivers		274,100 lb.
Weight, total engine		454,090 lb.
Tractive force		70,750 lb.

THESE TWO locomotives, representing typical freight motive power of strictly modern design 25 years ago and today, afford a striking comparison. With an increase in steam pressure of 25 per cent, in steam temperature of 80 per cent, in starting tractive force of 80 per cent, and in grate area of 94 per cent, the new locomotive produces a horsepower-hour on approximately one-third less fuel and water than the old. These figures only partially illustrate the advantages to be derived from operating the new power of today.

Many locomotives built as recently as ten years ago have neither the speed capacity now required, nor the modern equipment which helps to reduce operating costs. As approximately eighty per cent of the locomotives in use today are ten or more years old, is it not essential for the railroads, if they are to efficiently meet the existing traffic demands, to adopt a systematic program for replacing the old locomotives with strictly modern power?

*We are prepared, as never before,  
to aid in answering this question.*



THE  
**BALDWIN**  
LOCOMOTIVE WORKS  
PHILADELPHIA

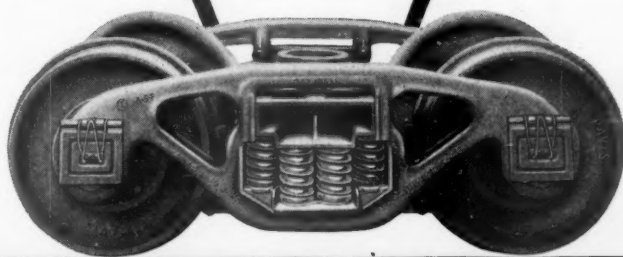


# Maintain the Oil Film



## STOP HOT BOXES

**T**HE additional spring capacity of the Dalman Truck protects not only equipment, lading and road-bed from destructive shocks but also the journal itself. The uncushioned blows caused by either overloading or failure of springs breaks down the film of oil and causes hot boxes. The Dalman Truck provides the spring capacity to cushion these blows, so that the film of oil is maintained, materially reducing bearing trouble.



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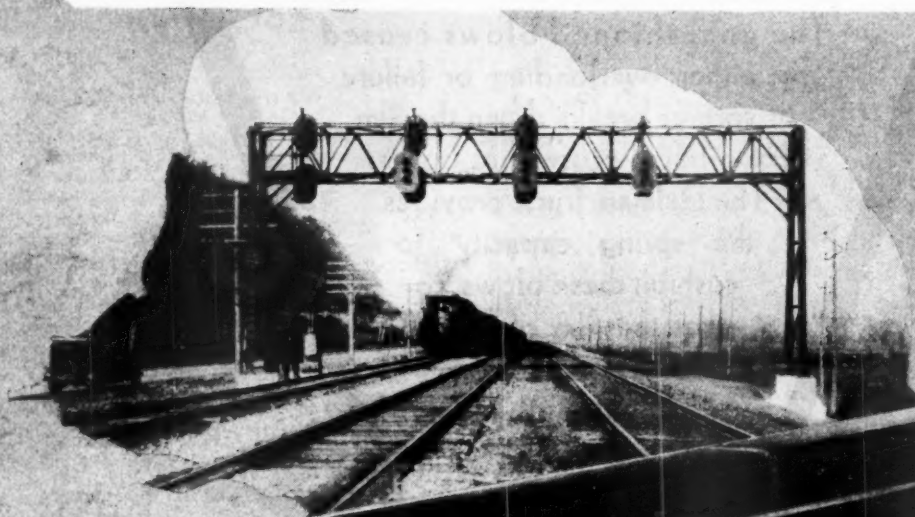
ST. LOUIS

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**F**OR safety's sake, be sure of the small things.  
Only the best fibre parts are safe and only the  
safest is most economical.

**THE RAIL JOINT COMPANY**

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**CONTINUOUS  
INSULATED  
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**AN EFFICIENT  
INSULATING DEVICE  
AND A MECHANICALLY  
STRONG TRACK JOINT**

## KEEPING PACE WITH PROGRESS



# What do you demand from Your Freight Car Plates?

**Y**OUR NEEDS for freight car plates and sheets may require varying specifications but here is one we always add:

*Produce a metal that will help you keep your cars on the road earning profits instead of in the shops increasing maintenance costs.*



**ARMCO**

**RAILROAD PRODUCTS**



Special Car Siding Sheets  
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Galvanized Ingot Iron  
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Of course, there are other savings when you use Armco plates and sheets. For instance, metal like Ingot Iron forms readily, welds soundly, takes and holds paint. Add to these increased tonnage-miles and the investment value is too inviting to be overlooked. We shall be glad to study your needs and recommend the suitable grade, gage, size and finish. Just get in touch with the office nearest you.

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FOR EXACTING  
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## Consider these PROVEN FACTS about wood preserving—



## Protection from stump to plant—



**AMERICAN CREOSOTING COMPANY**

COLONIAL  
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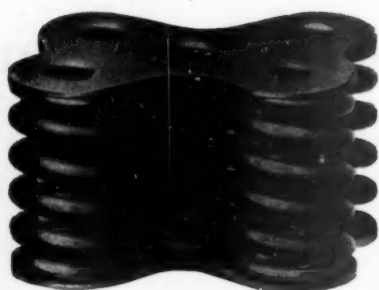
GEORGIA  
CREOSOTING  
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LOUISVILLE — KENTUCKY

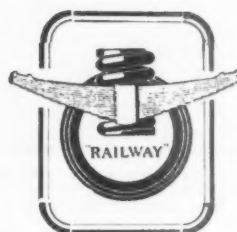
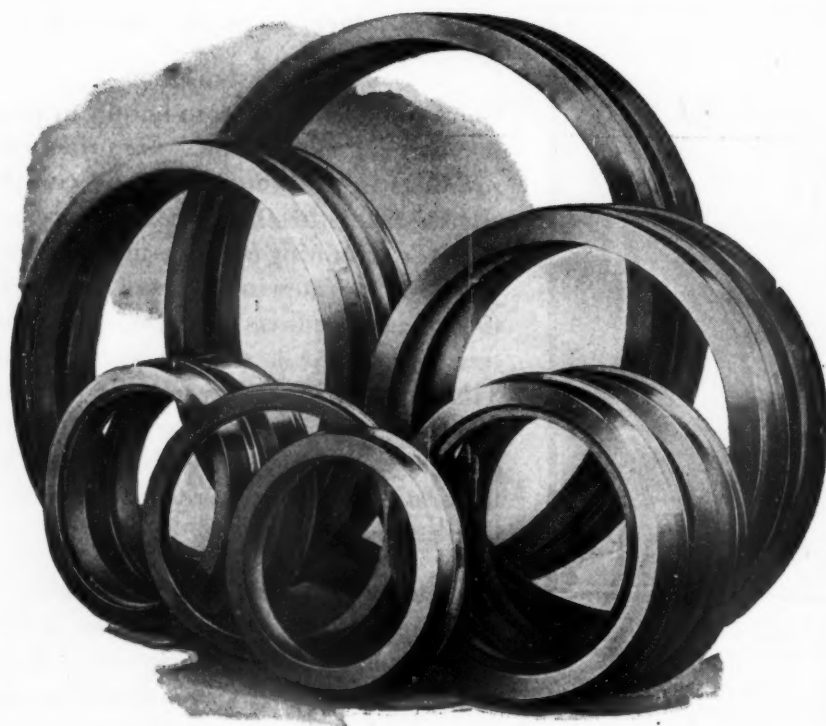
Even the best trees make poor poles, piles or ties if decay attacks them before they are preserved by creosoting. Control should start in the woods and continue through all the handling operations until the creosoted product is finally shipped to the point of use.

Continuous control from stump to plant is particularly important. Manufacture of products in the woods must be completed shortly after the trees are felled whether it be the trimming and peeling of poles and piles or the hewing or sawing of cross ties. These products must then be promptly transported to a proper yard or plant. Timber left in the woods or at sidings where no provisions have been made for storage deteriorate quickly and such deterioration cannot be readily detected by inspection.

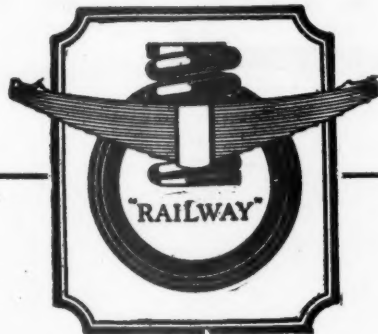
The control and protection of timber from the stump to the plant has been a fundamental principle in our operations throughout the last 25 years. We would be glad to show you how this fact influences the results secured from treated timber in service.



# UNIFORMITY







Absolute uniformity in all manufacturing processes is essential to the production of dependable parts. The equipment of this organization and its methods of product control insure uniform performance in service.

**Railway Steel-Spring Company**  
**30 CHURCH ST., NEW YORK**

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# Saniservis



## PAPER TOWEL VENDING MACHINE

### SANITATION

In general, the public must pay a nickel for a small cloth towel, or the railroads furnish paper towels free of charge, or else none are available. This machine has been developed, therefore, and perfected by the WEST DISINFECTING COMPANY.

### SERVICE

The public is entitled to ample facilities in the washroom and is very well satisfied to pay a penny for an absorbent, well made paper towel, and the railroads are entitled to the profits derived from the SANISERVIS PAPER TOWEL VENDING MACHINE.

## WEST DISINFECTING COMPANY

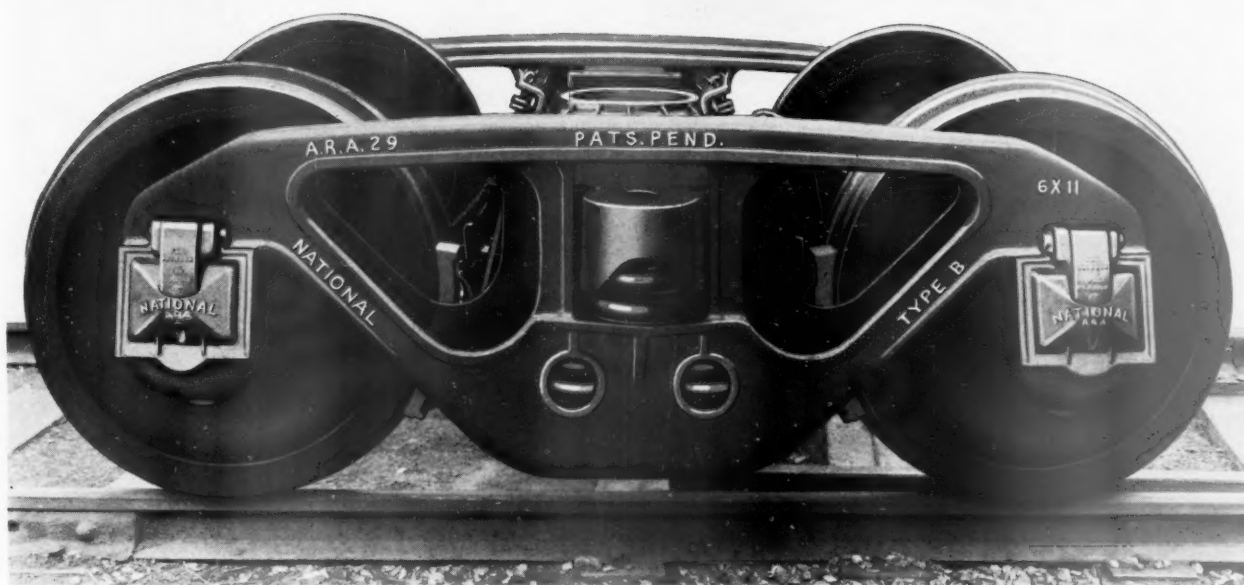
LONG ISLAND CITY, NEW YORK

*Branches in 42 Principal Cities*





# CUTTING MAINTENANCE COSTS



**A**NOTHER contribution to decreased maintenance costs is the National Type B Truck.

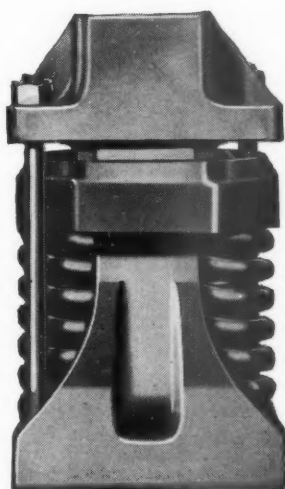
This truck, designed, developed and perfected by the National engineering and manufacturing organization, gives increased spring capacity, oversolid spring protection, quick wheel change, decreased weight, greater strength and flexibility.

The combination of these advantages means more continuous service from freight cars with lower costs for repairs and maintenance. Detailed explanation of this new and improved National Truck furnished on request.

**THE NATIONAL MALLEABLE & STEEL CASTINGS CO.**


General Offices: CLEVELAND, OHIO

Sales Offices: New York, Philadelphia, Washington, Chicago, St. Louis, San Francisco  
Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill.



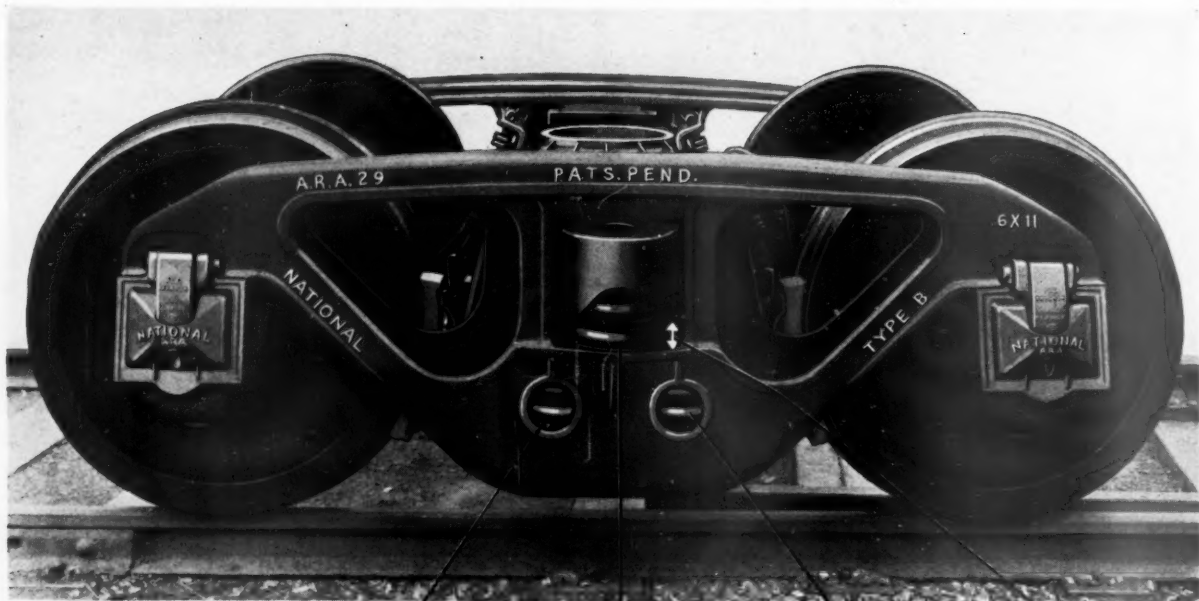
M17 National Draft Gear. A contribution to profitable freight operation. This gear stands first in the combination of capacity, sturdiness and endurance.

# NATIONAL

TYPE  B

## TRUCKS

# INCREASE SPRING CAPACITY



A.R.A.  
CLASS G  
SPRING

2  
A.R.A. CLASS G  
SPRINGS

A.R.A.  
CLASS G  
SPRING

OVERSOLID  
PROTECTION  
FOR  
SPRINGS



IN the 70 ton size the National Type B Truck provides 42% more spring capacity than A.R.A. requirements; 18% more spring deflection or travel; springs are protected from oversolid blows. The familiar Class G springs are utilized to obtain these advantages.


THE NATIONAL MALLEABLE & STEEL CASTINGS CO.

General Offices: CLEVELAND, OHIO

Sales Offices: New York, Philadelphia, Washington, Chicago, St. Louis, San Francisco


Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill.

# NATIONAL

TYPE  .. B ..

# TRUCKS





# They're **STRONG!** They're **SAFE!** They **LAST!**

Modern fast-freight service makes severe demands on wheels. It requires wheels that are safe, that eliminate costly delays due to slid-flats, shelled-treads, and broken flanges, that have strength and endurance, and that give many thousands of miles of trouble-free service. Bethlehem Light Weight Wrought Steel Wheels meet all these requirements.

Bethlehem Wheels are produced for all freight cars. To thoroughly cover the field this Company manufactures, in addition to the Bethlehem Light Weight Wheel for cars with a maximum carrying capacity of 57½ tons, light weight wheels for cars with carrying capacities up to 70 and 75 tons. All these wheels are made by the same process as the multiple-wear Bethlehem Wheel, but have a smaller hub, and lighter plate and rim than the corresponding wheels of the multiple-wear type.

These Bethlehem Light Weight Wheels for cars of maximum carrying capacities up to and including 75 tons are amply justifying their adoption—by their strength and endurance, by the many thousands of miles of trouble-free service that they give, and above all, by their safety.

**BETHLEHEM STEEL COMPANY**  
*General Offices: Bethlehem, Pa.*

*District Offices: New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Pittsburgh, Buffalo, Cleveland, Cincinnati, Detroit, Chicago, St. Louis*

*Pacific Coast Distributor: Pacific Coast Steel Corporation, San Francisco, Los Angeles, Portland, Seattle, Honolulu*

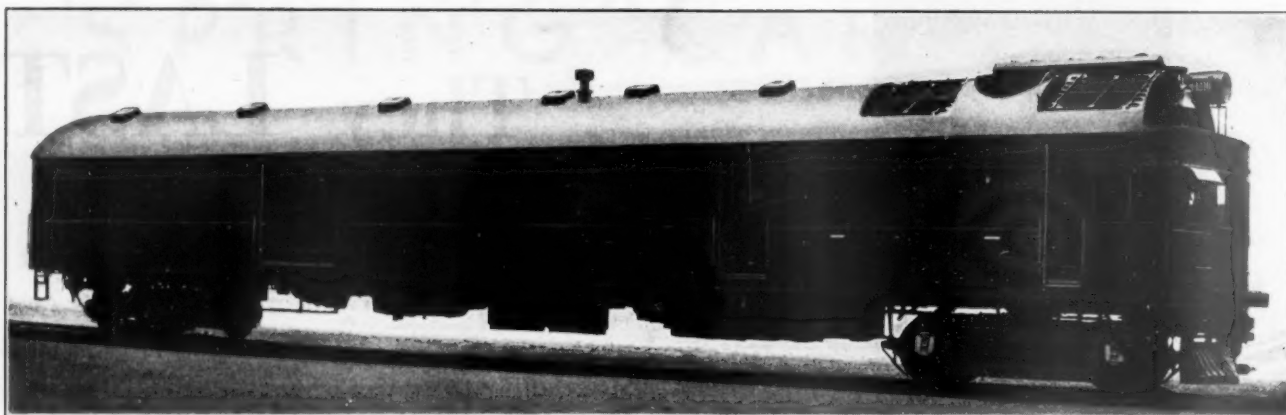
*Export Distributor: Bethlehem Steel Export Corporation, 25 Broadway, New York City*



# BETHLEHEM

## Wrought Steel Wheels

# TWO MORE FOR



*The first Model 860 combination baggage and mail car on the "Big Four"—in service since February 13, 1931*



*Repeat order for **Model 860** Gas-electric Cars an endorsement of satisfaction. Practical operating tests demonstrate successful application of larger types on various railroads. Operating economies on heavy traffic lines open larger fields to the installation of gas-electric cars.*

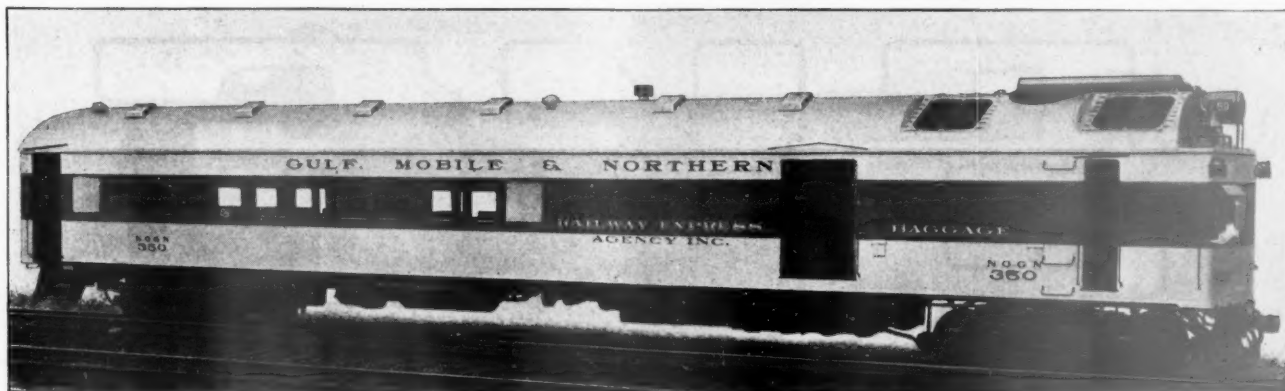
**Models**  
**660—415 H. P.**  
**and**  
**860—550 H. P.**

*"For the real power jobs"*

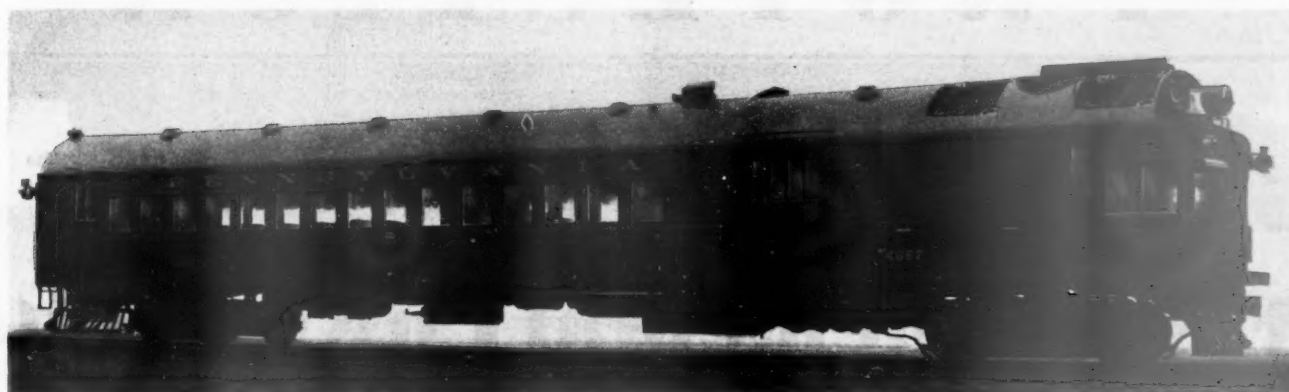
## BRILL GAS-ELECTRIC CARS

# THE "BIG FOUR"

**Other successful Model 860 and 660 Installations**



*Two Brill Model 860 Gas-Electrics—550 H.P.—in train service out of New Orleans.*



*Five Brill Model 660's—415 H.P.—in service on the Pennsylvania*



*Combination Baggage and Mail Brill Model 660—standard 30 ft. mail compartment*



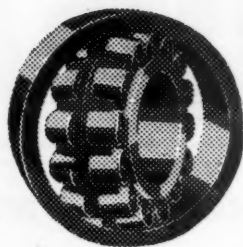
**THE J. G. BRILL COMPANY, PHILADELPHIA — Automotive Car Division**

Chicago Office: Harris Trust Bldg.

St. Louis Office: Syndicate Trust Bldg.

San Francisco Office: Rialto Bldg.






---

**PROTECTION**

---



## For Supplemental Power Units

**M**ODERN locomotives include a supplemental power unit mounted on trailer or tender as a fundamental part of their design.

This added power, so essential in starting heavy loads, has greatly increased the stress on the journal bearings, involving thrust as well as radial loads.

The supplemental power unit itself is so important to efficient operation that it deserves the most effective and reliable journal bearings for the truck on which it is mounted. SKF is the natural choice to eliminate any possibility of bearing trouble.

Heavy loads and severe lateral thrusts are familiar problems to SKF.

Because of its two rows of rollers, the SKF Journal Bearing provides the maximum bearing capacity in a given space. Since SKF Bearings are completely self-aligning, they distribute the load equally at all times over two rows of rollers.

SKF Journal Bearings run cool and dependably because the rolling elements are not constrained and therefore are free to take the proper rolling position.

Bearing trouble cannot become acute when SKF services the equipment.

2739

**SKF INDUSTRIES, INCORPORATED**

40 East 34th Street, New York, N. Y.



# Careful Analysis

THE FIRST STEP  
IN BIRD-ARCHER  
WATER TREATMENT

THREE modern laboratories, located to serve their respective territories, furnish the scientific information upon which Bird-Archer water treatment is based.

Samples of boiler feed water sent to any one of these laboratories are analyzed by competent chemists and recommendations made for the prevention of boiler troubles. They are made with a complete knowledge of both the technical and practical sides of the problem.

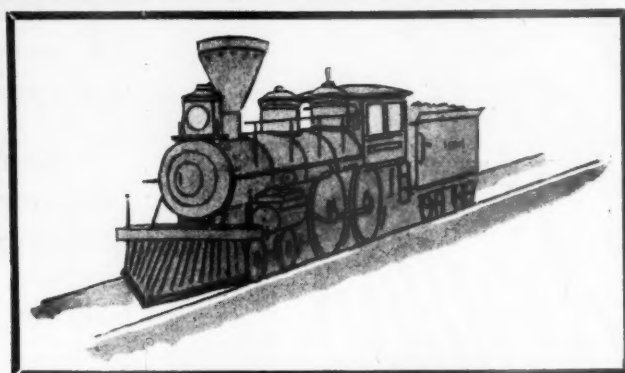
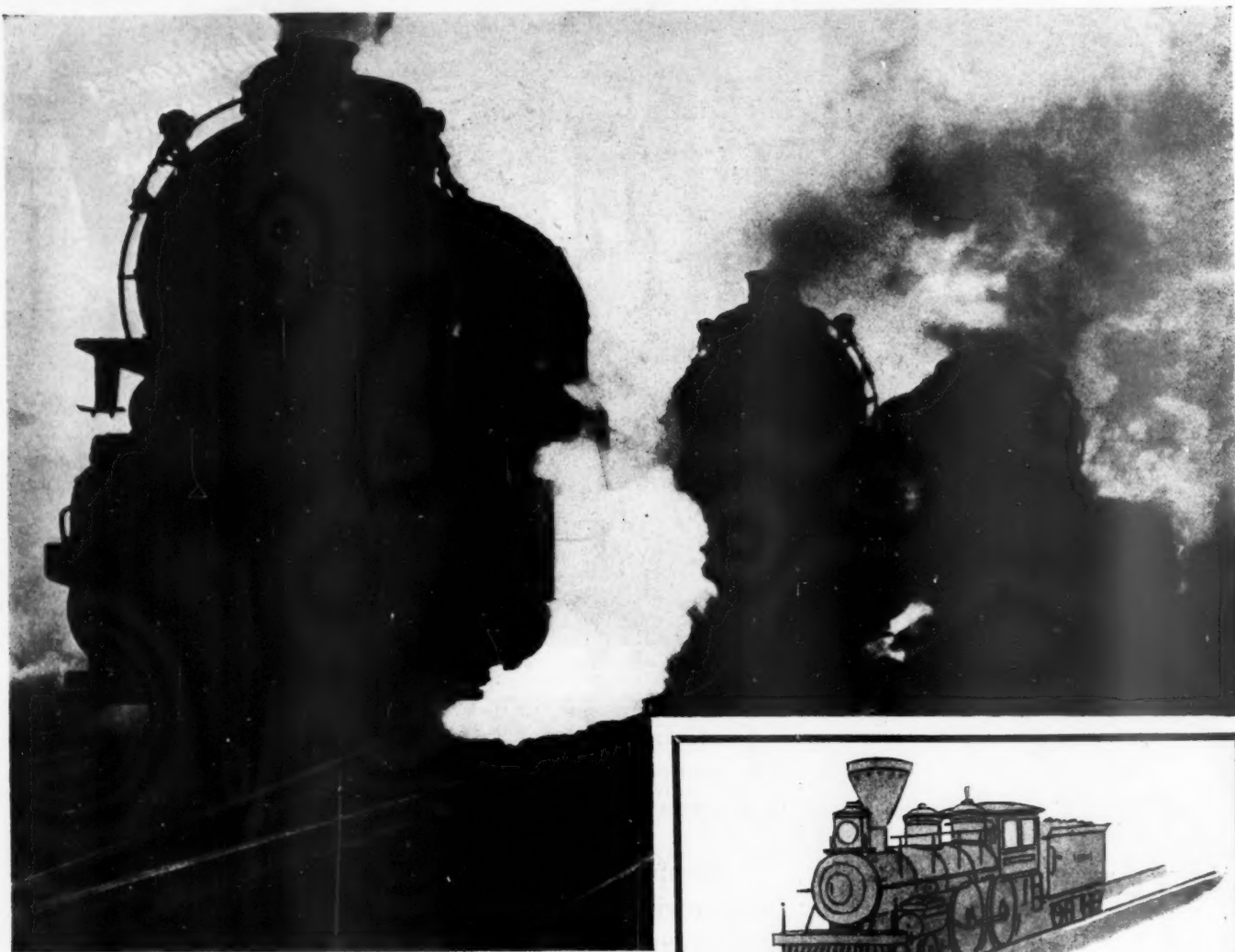
In addition to careful analysis, the variable conditions encountered and the ease and economy of applying the treatment are also considered.

Bird-Archer Water Treatment can be furnished in various forms to suit the requirements of the user. Behind it is a long record of economical application on locomotive and stationary boilers.

Water Analysis and recommendations made without cost at your nearest laboratory.

# B-A WATER TREATMENT

The BIRD-ARCHER Company  
NEW YORK • CHICAGO • ST. LOUIS  
The Bird-Archer Company, Limited, Montreal



Just as "Standard"  
Materials keep on giving economical  
trouble-free service through the years,  
so do we keep everlastingly at it—in  
research, designing and developing to  
make "Standard" Steel parts even better.

## STANDARD STEEL WORKS COMPANY

GENERAL OFFICES & WORKS: BURNHAM, PA.

NEW YORK  
CHICAGO  
PHILADELPHIA

ST. LOUIS  
RICHMOND

AKRON  
PORTLAND  
SAN FRANCISCO



# ECONOMY—IS THE WATCHWORD

*TODAY'S standard  
of wheel economy and safety  
is the single plate Chilled Tread  
Wheel of TODAY.*

## Chilled Tread Wheels

From both the chemical and physical standpoint possess inherent properties found in no other wheel.

The wearing surfaces of flange and tread have sufficient bearing power to carry the heaviest loads without permanent deformation, and have a maximum resistance to abrasion.

The metal of the tread and flange has a maximum wearing value.

The wearing service of the flange and tread causes the least abrasion to the rail.

It is easily applied and removed, and requires a minimum of shop appliances.

Annealing practices followed by the manufacturers assures soft plates giving greater resistance to the thermal stresses developed by the most severe brake action, and soft hubs which are easily bored and give minimum mounting cost.

*The single plate chilled tread wheel is another way of saying "Wheel Economy."*

### *Better Every Year*

A slogan and a fact based upon definite laboratory and foundry programs.

---

FOR THE 70-TON CAR THE 850-LB. CHILLED TREAD WHEEL—THE HEAVIER THE CAR CAPACITY THE GREATER THE FACTOR OF SAFETY.

---

## CHILLED TREAD WHEELS

*A. R. A. Standards*

650-lb. for 30-ton Cars—700-lb. for 40-ton Cars—750-lb. for 50-ton Cars—850-lb. Wheel for 70-ton Cars

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS  
1847 McCORMICK BUILDING, CHICAGO, ILLINOIS





"KICKING" cars is a necessary switching operation, but it often causes damage that the Purchasing and Claim Departments are concerned about. New couplers, knuckles, followers, siding, roofing, damaged or destroyed lading, etc. cost money.

The obvious remedy is to provide real protection from switching shocks. In other words, to replace inadequate draft gears with Cardwell and Westinghouse Draft Gears.

## CARDWELL WESTINGHOUSE CO.

332 S. Michigan Ave.

Chicago, Illinois

PITTSBURGH, PENNSYLVANIA

MONTREAL, QUEBEC, CANADA



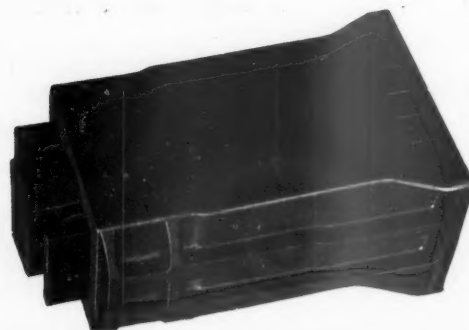
Cardwell L-25 Friction Draft Gear



Cardwell Westinghouse Friction Draft Gear Type F-2

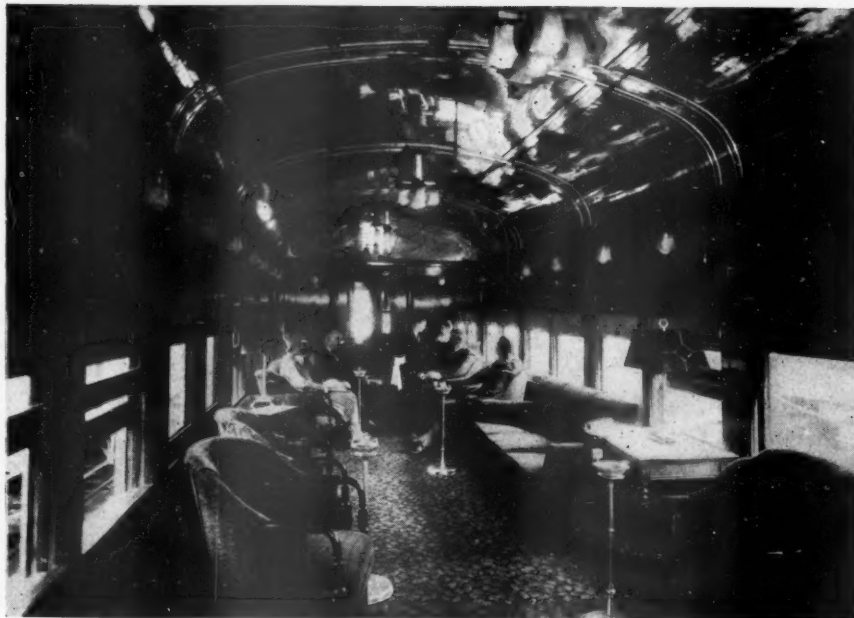
### Cardwell Westinghouse Draft Gears

Made in types and designs to fit any kind of car construction or draft gear attachments on new or old equipment, and in sizes and capacities which meet all modern and A. R. A. requirements. » » » »



Westinghouse NY-11-D Friction Draft Gear

GOOD DRAFT GEARS MAKE CARS GO FARTHER



*The use of a variety of our patterns and colors in Mohair pile fabrics produces a pleasing and restful effect in up-to-date observation cars. May our stylist help you with your decoration problems?*

## MASSACHUSETTS MOHAIR PLUSH COMPANY

*Manufacturers of Railroad Plush for 39 Years  
Makers of Bay State Plush*

Main Office  
80 FEDERAL STREET, BOSTON, MASS.

Railroad Sales Representatives  
Midgley & Borrowdale Willoughby Tower, Chicago, Ill.

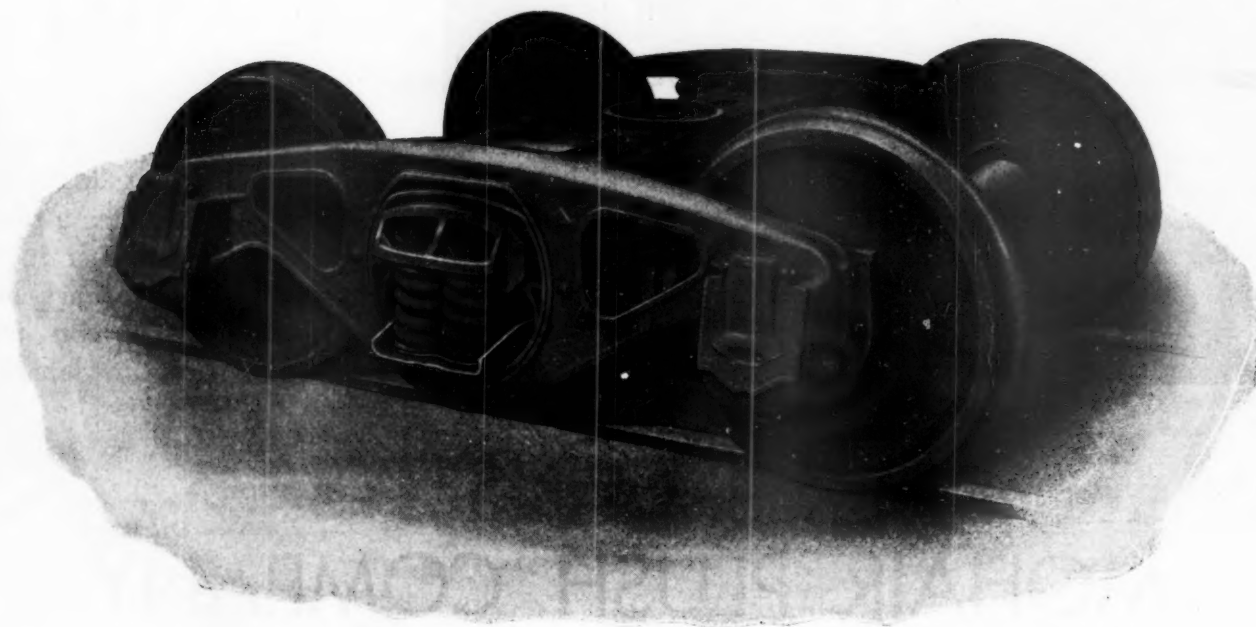
*To the comfort of rotating seats is added the beauty and durability of Bay State Plush, producing the pleasing harmony of the modern coach interior. We shall be pleased to submit new colors and designs.*



Coach of New Haven Railroad



# TAYLOR FLEXIBLE TRUCKS FOR FREIGHT CARS



**T**AYLOR Flexible Trucks are not an experiment—thousands are in service—each one of them a conclusive demonstration of both safety and operating economy.

**Safety**—because the flexible feature found only in Taylor trucks greatly reduces stresses in truck members and their connections. Twisting and racking strains are eliminated—and there is much less possibility of either derailment or failure of any essential detail.

**Operating economy**—because Taylor trucks are flexible they ride easily—each wheel passes over track irregularities without affecting any other wheel—binding of flanges against rails is eliminated—flange drag is reduced—train resistance is less—and maintenance expenses are greatly minimized.

An application of Taylor Flexible Trucks to your freight equipment will demonstrate beyond question that “Taylor Flexibles” have inherent advantages of outstanding importance and are particularly well adapted to the heavy loading and high speeds encountered in the movement of modern freight traffic.

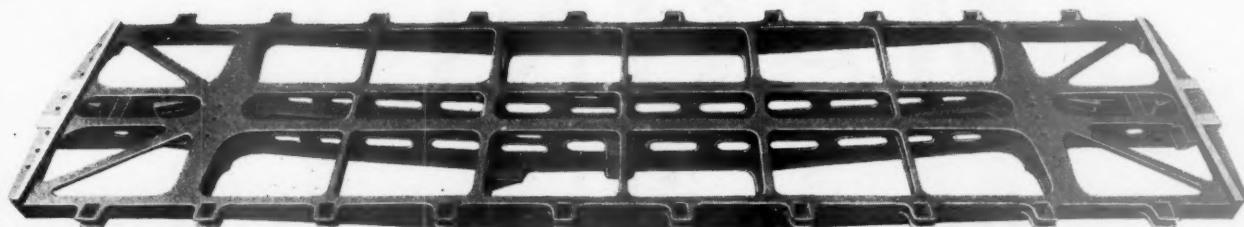
## FLEXIBLE TRUCK CORPORATION

314 GANSTER BUILDING

READING, PA.

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# Specify Commonwealth



## **CAST STEEL FREIGHT CAR UNDERFRAMES** *For All Types of Cars*

**Provide Increased Strength**

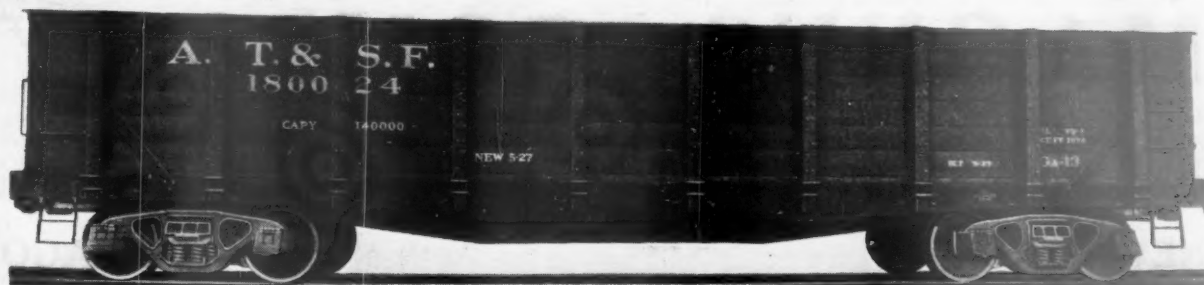
**Resist Corrosion**

**Eliminate Repairs and Maintenance**

**Increase Revenue Car Miles**

**Large Number Now in Service**

*For Efficiency and Economy*



CAR EQUIPPED WITH COMMONWEALTH UNDERFRAME

**GENERAL STEEL CASTINGS CORP.**

GRANITE CITY, ILL.

EDDYSTONE, PENN.

For SERVICE AND DELIVERY

# MAGNUS METAL

---

WHERE RECORDS ARE MADE YOU  
WILL FIND MAGNUS PRODUCTS

"MAGNUS PRODUCTS ARE BRASS INSURANCE"

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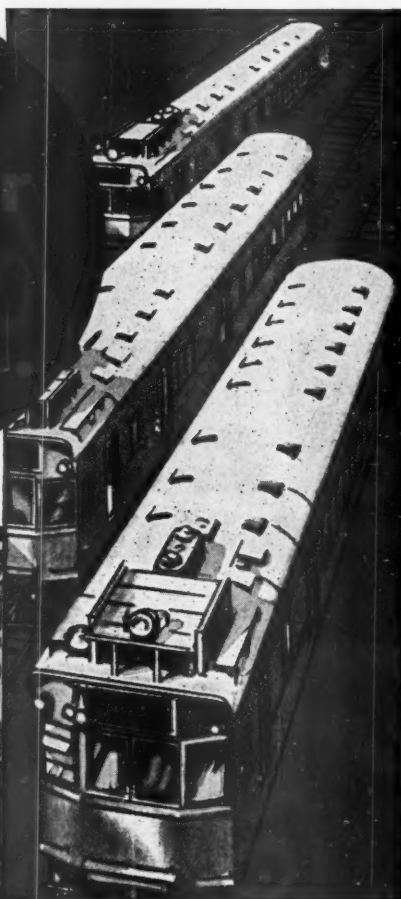
## MAGNUS COMPANY

*INCORPORATED*

NEW YORK

CHICAGO





3 Electro-Motive Cars

Release 5 or More  
Locomotives

**E**VERY railroad that has put Electro-Motive Cars in service has invariably released more than an equivalent number of steam locomotives.

To cite a few instances:

One prominent road put 3 Electro-Motive Cars in service and replaced 5 locomotives.

Another road, with 10 Electro-Motive Cars released 18 engines.

And the ratio of rail cars to locomotives goes down as additional Electro-Motive Cars go into service. On one road, 57 Electro-Motive Cars have replaced 206 locomotives.

The explanation is a simple one. An Electro-Motive Car does not have to be handled twice a day at a terminal. There are no fires to clean, no bulky fuel to handle, no big water tanks to fill—and, incidentally, no stand-by fuel losses.

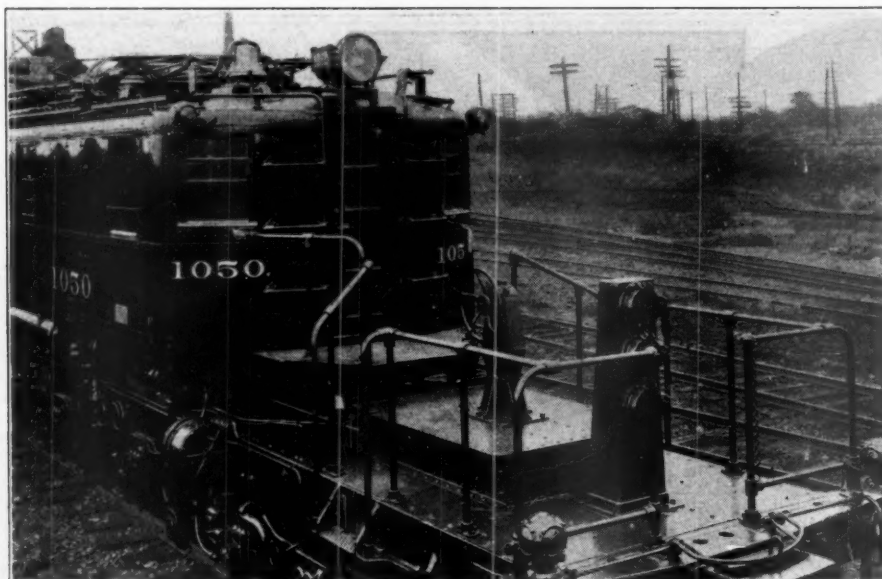
With its lower operating cost per mile, its higher percentage of availability and the reduction it effects in terminal expense, the Electro-Motive Car is the most economical transportation unit for many types of service.

# THE ELECTRO-MOTIVE COMPANY

NEW YORK  
Graybar Bldg.

CLEVELAND		OHIO	
SUBSIDIARY			
GENERAL MOTORS CORPORATION			
CHICAGO	ST. LOUIS		
Peoples Gas Bldg.	Railway Exchange Bldg.		
GAS-ELECTRIC	MOTOR CARS LOCOMOTIVES POWER PLANTS	GAS-ELECTRIC	

SAN FRANCISCO  
Rialto Bldg.



*Illustration of the PEACOCK BRAKE on one of the latest types of  
ELECTRIC LOCOMOTIVES*

**T**HE PEACOCK No. 450 BRAKE  
has been installed on almost all  
the ELECTRIC LOCOMOTIVES  
built during the last two years.

These heavy units need and use  
PEACOCK BRAKES.

Ask the enginemen who run them.  
They know these brakes as a man can  
only from frequent use.

Give them a reliable brake; they know  
PEACOCKS are.

**NATIONAL BRAKE COMPANY, INC.**  
**BUFFALO, N. Y.**

General Sales Office, 50 Church Street, New York City

---

# **THE NEW YORK AIR BRAKE CO.**

**HIGH CAPACITY FEED VALVES  
FOR LOCOMOTIVES, GAS  
ELECTRIC RAIL CARS, AND  
MULTIPLE-UNIT SERVICE**



**STANDARD  
AIR BRAKE EQUIPMENT  
AND REPAIR PARTS  
Supplied For  
EVERY TYPE OF STEAM  
AND ELECTRIC LOCOMOTIVE,  
PASSENGER AND FREIGHT  
CAR, INCLUDING GAS AND  
OIL ELECTRIC RAIL CARS  
AND LOCOMOTIVES**

**General Offices:**

**420 LEXINGTON AVE., NEW YORK, N. Y.**

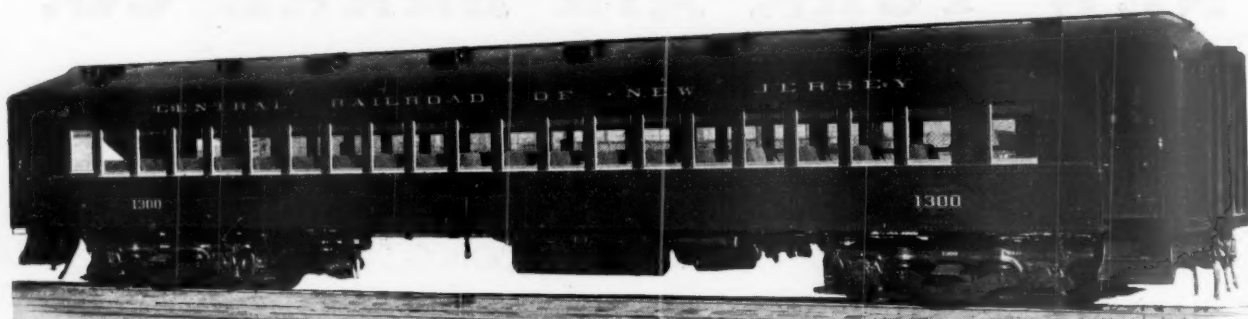
**Works:**

**WATERTOWN, N. Y.**



# PRESSED STEEL CAR COMPANY

FREIGHT AND PASSENGER CARS—ALL TYPES



STEEL PASSENGER COACH BUILT FOR CENTRAL RAILROAD OF NEW JERSEY

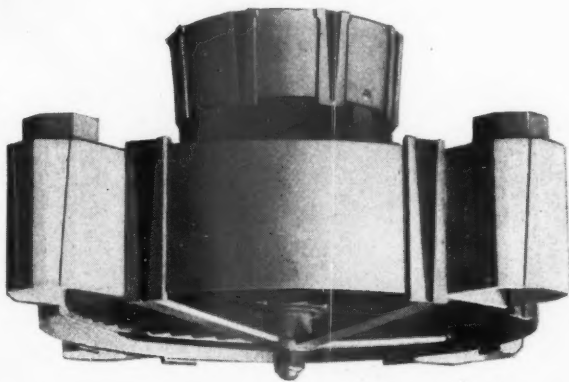


AUTOMOBILE FURNITURE CAR BUILT FOR PERE MARQUETTE RWY.

**KOPPEL AUTOMATIC AIR DUMP CARS**  
**REFRIGERATOR CARS—TANK CARS**  
**COMPLETE FACILITIES FOR REPAIRING CARS**

STEEL UNDERFRAMES—CAST STEEL BOLSTERS  
 AND SIDE FRAMES—CHILLED TREAD WHEELS  
 PRESSED PARTS—FORGINGS—STEEL AND  
 MALLEABLE CASTINGS

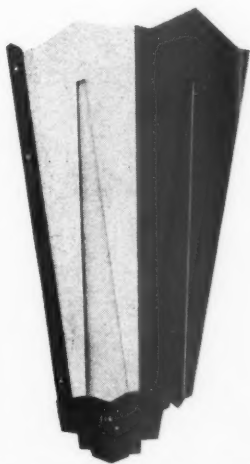
NEW YORK    PITTSBURGH    CHICAGO    ST. LOUIS    ST. PAUL



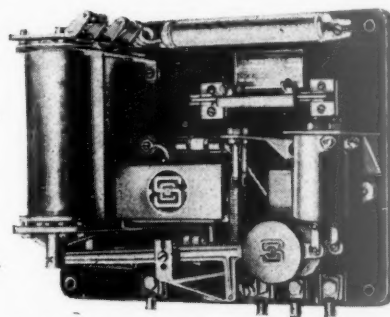
*Decorative or plain Fandoliers furnished with or without lighting fixtures.*



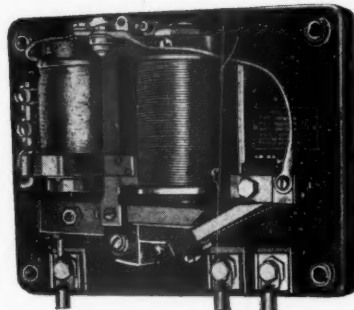
*Safety Double Pile Lamp Regulator mounted on Drawn Steel Panel.*



*Ceiling lights, side lights, and table lights of standard or special design.*



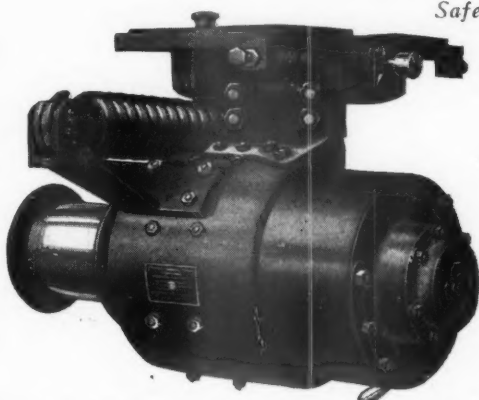
*Safety Generator Regulator Mounted on Drawn Steel Panel.*



*Safety Standard Switch Mounted on Drawn Steel Panel*



*Special creative designs to harmonize with special requirements*



*Under-Frame Generator and suspension with spring for "off center" mounting*

**Y**EARS of experience concentrated in the present requirements of the car lighting industry make it possible for the Safety Company to offer a complete service for the illumination of any car interior.

With this service there is no division of responsibility. Safety, with its thorough understanding of railway requirements, stands back of the entire system.



## THE SAFETY CAR HEATING & LIGHTING CO.

NEW YORK

CHICAGO

ST. LOUIS

BOSTON

PHILADELPHIA

SAN FRANCISCO

MONTREAL



## **DEPENDABLE! SAFE!**

**Y**OU CANNOT see Schaefer Brake Gear Details at work—taking the constant wear and resisting the sudden jolts of brake applications.

But you know that Schaefer Brake Details are dependable. Dependable because they are made to exacting standards with care and manufacturing skill—the result of fifteen years of specialization in brake gear details.

By rendering the service they do, Schaefer Brake Gear Details increase safety and help to keep revenue equipment in operation.

**SCHAEFER  
EQUIPMENT  
COMPANY**

*General Offices*

KOPPERS BLDG.

PITTSBURGH, PA.

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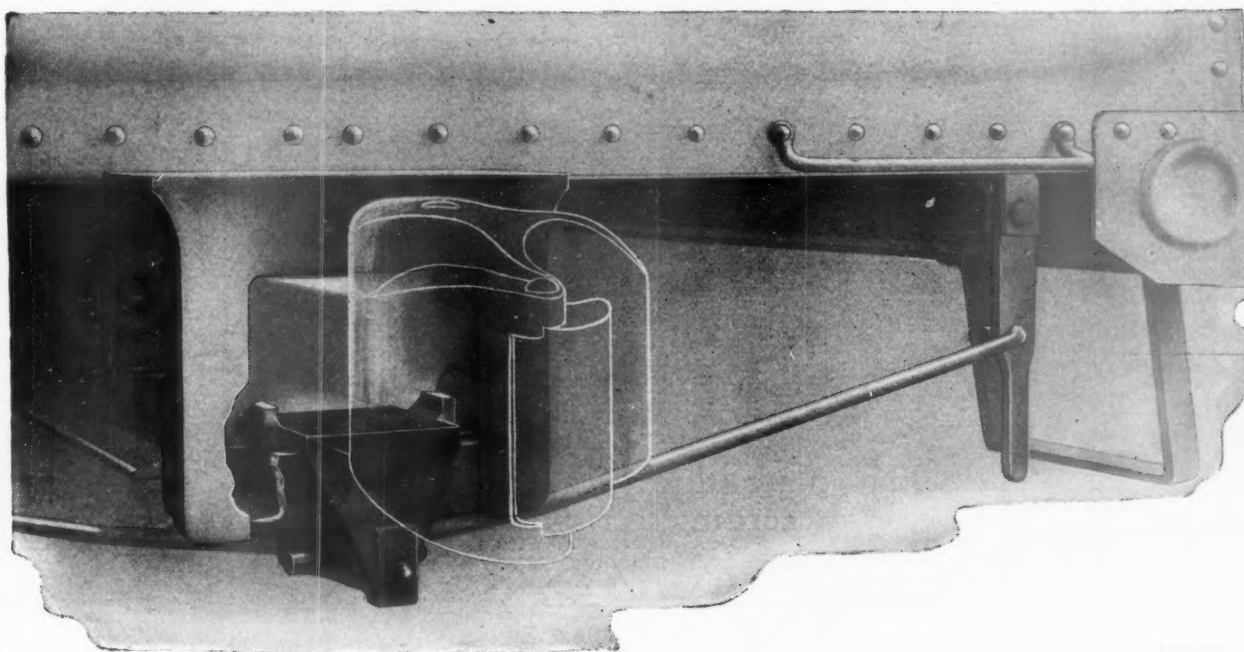
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# *Universal*

## DRAWBAR ADJUSTER



A SAFETY DEVICE

INCORPORATED IN THE A.R.A. BUFFER

OR

U.S.R.A. CARRY IRON

**Universal Draft Gear Attachment Co.**

332 S. Michigan Avenue, Chicago

Royal Bank Building, Montreal, Canada

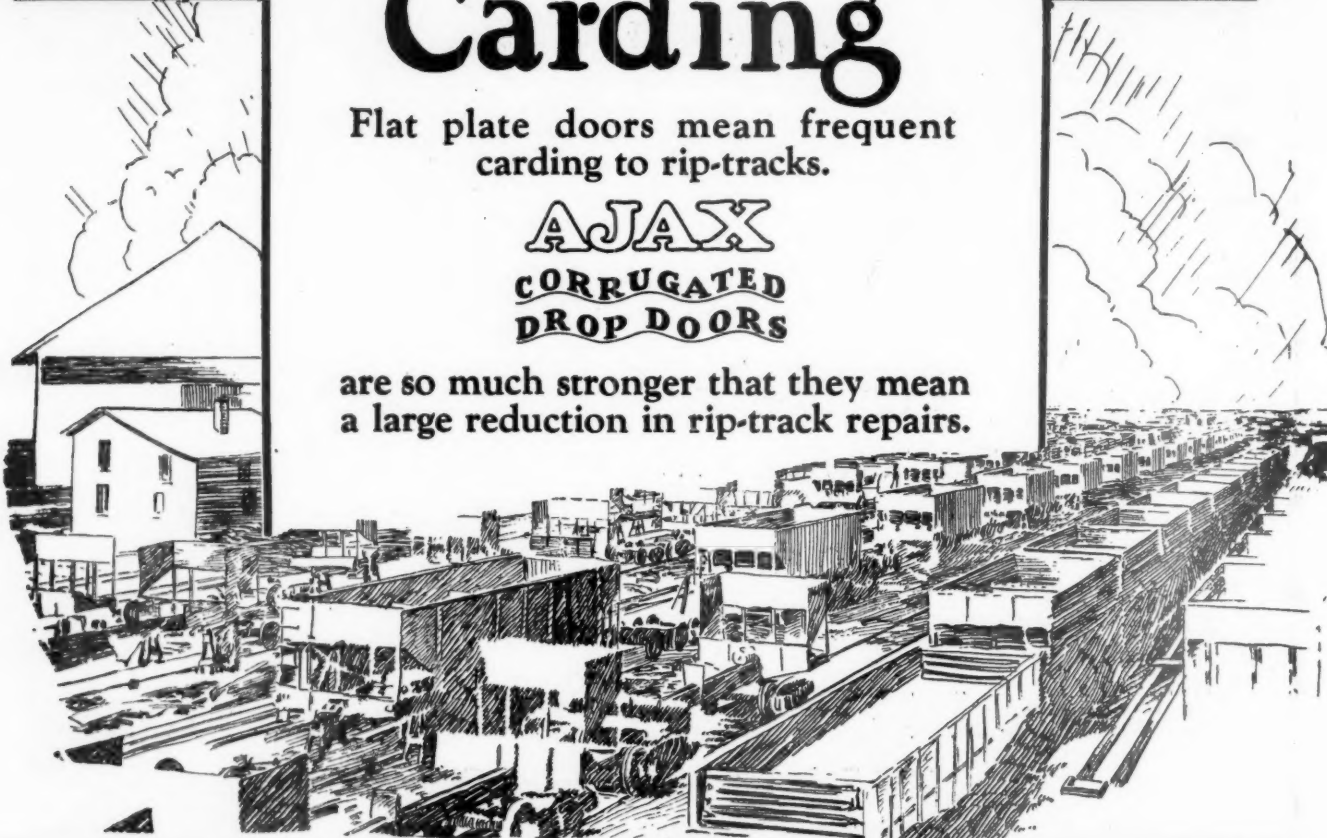


# Expensive Carding

Flat plate doors mean frequent carding to rip-tracks.

**AJAX**  
CORRUGATED  
DROP DOORS

are so much stronger that they mean a large reduction in rip-track repairs.



---

## UNION METAL PRODUCTS COMPANY

NEW YORK · CHICAGO ·

ST. LOUIS · WASHINGTON

RICHMOND · HOUSTON · SAN FRANCISCO · KANSAS CITY · MONTREAL

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# WHITCOMB



## JOINS BALDWIN

Pioneer in the adaptation of the internal combustion engine to industrial locomotives . . . originator of many outstanding advancements in industrial locomotive design . . . producer of powerful, economical locomotives in sizes from 3 to 80 tons . . . famed wherever industrial hauling is to be done, the Geo. D. Whitcomb Company has reorganized . . . has incorporated as The Whitcomb Locomotive Company . . . has joined the group of manufacturers headed by that ever progressive, hundred year old leader in Motive Power, The Baldwin Locomotive Works. The new executive personnel extends greetings to all Whitcomb clients, both present and prospective.

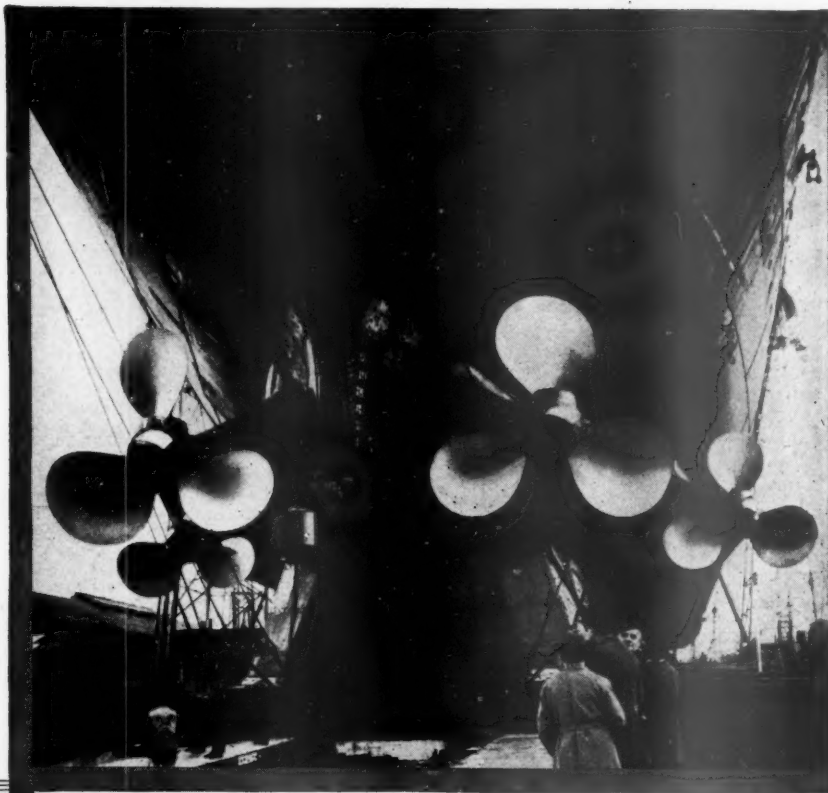
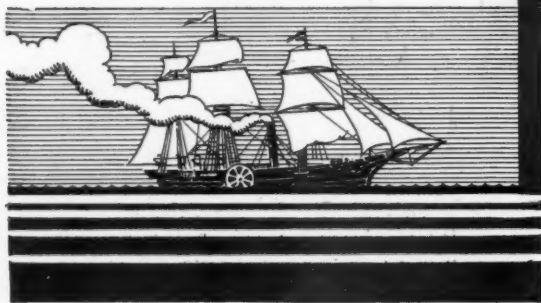
THE WHITCOMB LOCOMOTIVE COMPANY  
ROCHELLE, ILLINOIS

# WHITCOMB LOCOMOTIVES



## THE PROPELLER

was responsible  
for better  
steamships



*Ethyl* is responsible  
for better cars  
and **BETTER GASOLINE**

IN 1819, the side wheeler *Savannah* crossed the Atlantic under steam power, and the world said the modern age of travel had been achieved. But in John Ericsson's mind there remained the vision of improvement—a vision that became a reality after the introduction of his screw propeller.

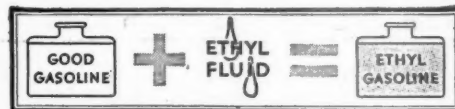
In 1920 many engineers said, "Automotive progress has reached its peak. Greater efficiency is possible only with higher compression, and gasoline can't stand the pressure."

Then Ethyl fluid was introduced. Added to good gasoline, this ingredient produced a motor fuel that would stand the necessary pressure without detonating. Ethyl Gasoline opened the way to higher compression engines—offering: increased power

without increased weight, increased acceleration and, at the same time, decreased heat waste.

Ethyl Gasoline is needed in the high compression engines that power the best busses today.

It provides you with a motor fuel that cuts time and adds comfort to travel in *any* bus. It brings out the maximum power of present-day engines. It is ready for the needs of tomorrow. Ethyl Gasoline Corporation, Chrysler Building, New York City.

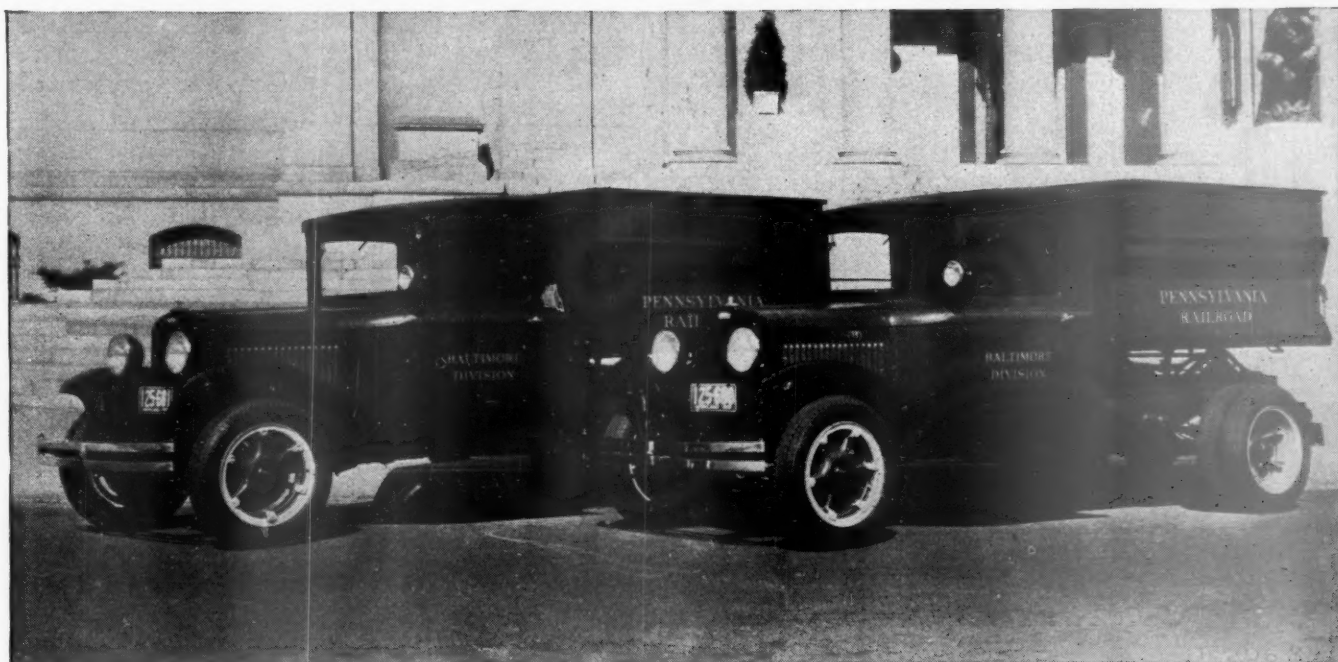


© R. G. C. 1931

The active ingredient used in Ethyl fluid is lead

# ETHYL GASOLINE

# MILLION-DOLLAR CONCERNS HAVE TESTED THESE TRUCKS FOR YOU



Million-dollar concerns in all Industries . . . the country over . . . have proved the merit of Dodge Trucks for you. Million-dollar concerns with hauling work similar to your own, and with a desire—identical with that of yours—for low cost, dependability and able performance. Million-dollar concerns who continue year after year to increase their already large fleets of dependable Dodge Trucks. » » Your Dodge Brothers dealer will gladly show you the impressive list of nationally-known concerns who have put their faith and their dollars in Dodge Trucks. He will also gladly place a Dodge Truck at your disposal

for inspection, test and comparison. You will find its price exceptionally low. You will find that balanced design and precision manufacture insure typical Dodge dependability, long life and economy.

THE COMPLETE LINE OF DODGE TRUCKS RANGES IN PAYLOAD CAPACITIES FROM 1,200 TO 11,175 POUNDS—PRICED, CHASSIS F. O. B. DETROIT, FROM \$435 TO \$2695, INCLUDING THE 1½-TON CHASSIS AT **\$595**

## TO HELP LOWER YOUR HAULING COSTS OPERATING RECORD BOOK FREE

DODGE BROTHERS CORPORATION  
Detroit, Michigan

B-42

Send your Operating Record Book. I understand there is no obligation.

NAME \_\_\_\_\_


ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

Number of Trucks Operated (Book for each will be sent) \_\_\_\_\_

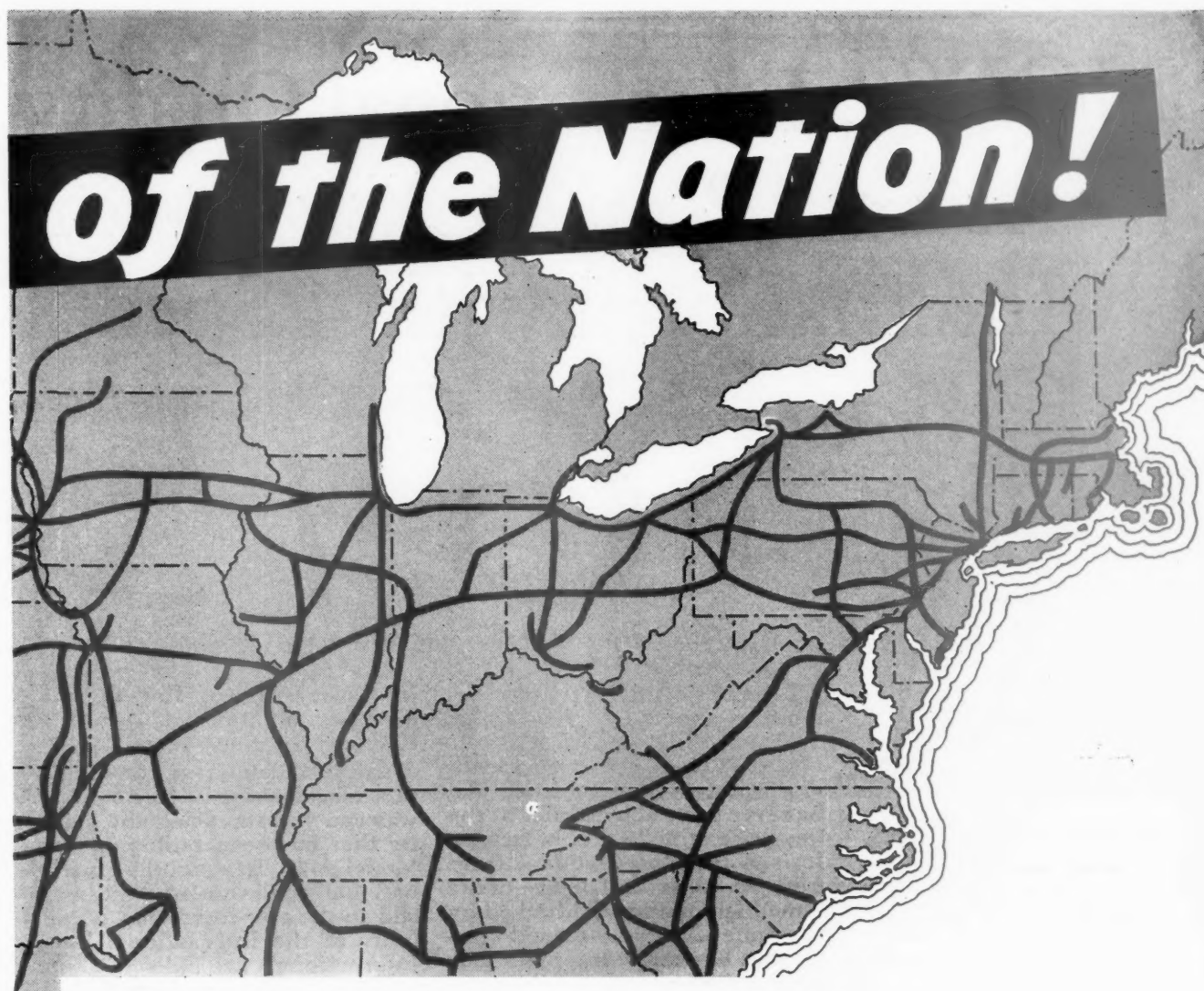
# DEPENDABLE DODGE TRUCKS

# *On the Bus-Ways*



THROUGH EVERY STATE IN THE UNION speed the buses equipped all around with Firestone Bus Balloons. Operating revenues are greater . . . passenger goodwill is built higher . . . schedules are maintained better — because road delays are a rare event. Specify Firestone Gum-Dipped Balloons, Firestone Tubes, and Firestone Rims when purchasing new equipment.





**Firestone BUS BALLOONS** *run over a million miles a day on the above net work.*

Wherever your buses run—on any roads—in any weather—you'll get the best service from Firestone Bus Balloons. We know that's true because they are resisting severe punishment every minute on bus runs from Coast to Coast, from the Lakes to the Gulf.

Firestone Bus Balloons together with Firestone Service give you the unbeatable combination that almost entirely eliminates road delays—insuring regular schedules—building goodwill—thus assuring greater profits.

How does Firestone give you all this? Standardized service plus Firestone Extra Values is the answer . . . Gum-Dipping, a Patented Firestone Process—adds

58% longer flexing life to every cord and 25 to 40% longer tire life . . . The Double Cord Breaker—another patented construction feature—gives 26% greater protection against punctures and blowouts—56% stronger union between tread and cord body. The tough, thick, Firestone tread gives 25% longer Non-Skid wear. All this means more strength—more mileage—more safety—MORE TIRE—at the lowest prices in history.

It will pay you to get in touch with a Firestone representative today. He will give you complete information, about Firestone Bus Balloons, Firestone Rims, and Firestone Service.

# Firestone

## BUS BALLOONS

TIRES • TUBES • BATTERIES • RIMS • BRAKE LINING • ACCESSORIES

# NOW.. International Quality At Low Price—a New 1½-ton International with 4 Speeds Only \$675

*136-inch wheelbase chassis, standard equipment, f. o. b. factory*



## MODEL A-2 FEATURES

4 forward speeds.  
22 ball and roller bearings.  
Powerful engine, L-head type;  
3½ in. bore, 4½ in. stroke;  
ample power with unusual  
fuel economy.  
Cam-and-lever steering gear.  
Vibration-dampened clutch.  
2 wheelbases: 136 and 160 in.

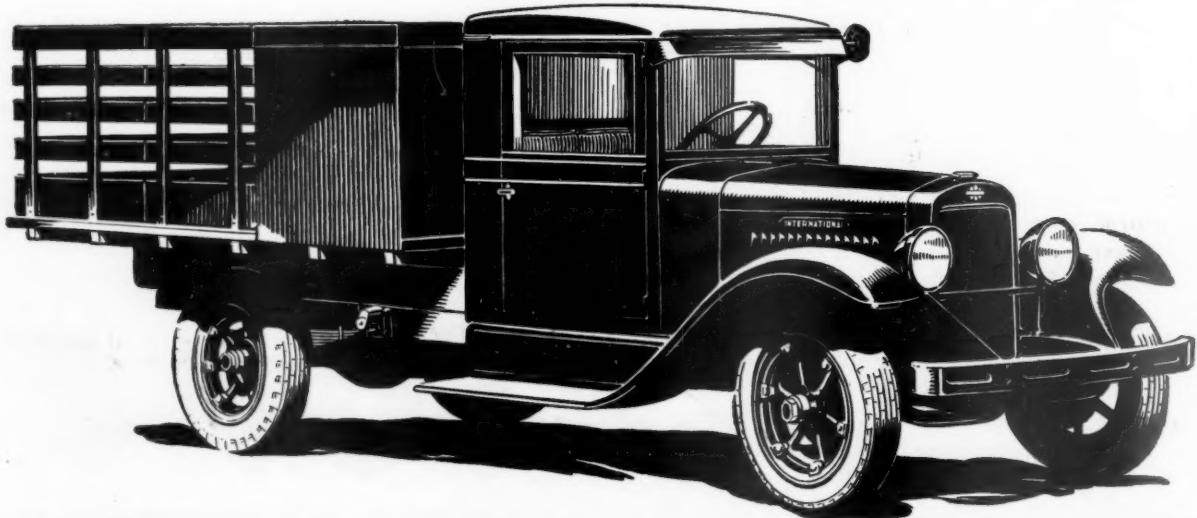
International Harvester announces a new 1½-ton, 4-speed, 136-inch wheelbase truck—the Model A-2. A better truck with more power than International has ever been able to offer at the low price of \$675 f. o. b. factory. It is a true International from front bumper to tail-light—of the same high quality and backed by the same Company-owned service that has made Internationals famous for low-cost hauling.

Here are power, speed, stamina, attractive lines, and all-around dependability. Here also is abso-

lute assurance of low upkeep expense and unusual operating economy for many years.

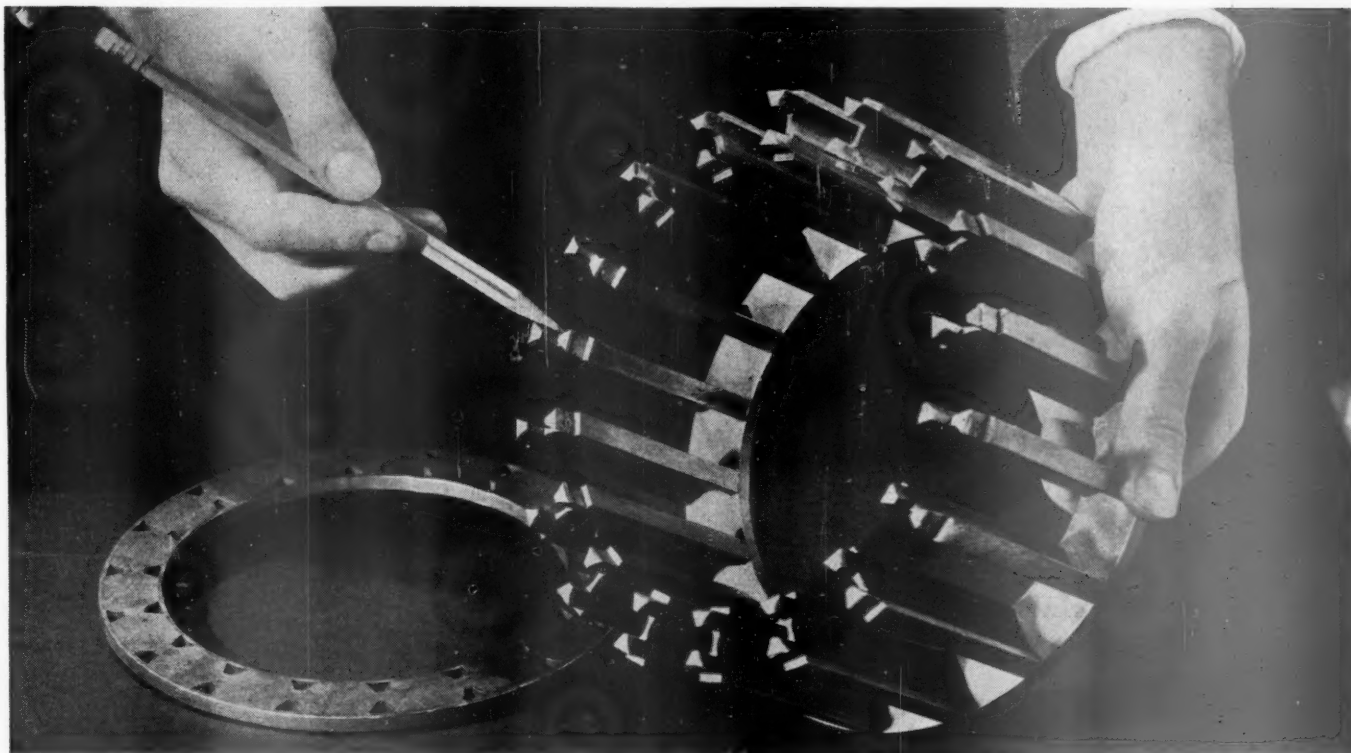
Ask for a demonstration of this new truck. Drive it. In no other way can you appreciate the quality that has been built into the Model A-2. It is another International achievement that will add to the ever-increasing popularity of the International line. Internationals are built in ¾-ton to 5-ton capacities. Sizes for all needs. There are 183 International Company-owned branches. Call on the nearest branch.

INTERNATIONAL HARVESTER COMPANY  
606 So. Michigan Ave. OF AMERICA  
(Incorporated) Chicago, Illinois



# INTERNATIONAL TRUCKS

# THESE SPACER BARS . . . .



*guide the rollers to longer life*

**T**RUE rolling action is obtained in the Fafnir-Melcher Roller Bearing by this sturdy riveted retainer. The spacer bars are curved to conform to the curvature of the rollers and so spaced as to keep all of the rollers in perfect alignment. Wear is thus at a minimum, life prolonged and the need for maintenance greatly reduced.

Roller paths are of tough alloy steel, ground to mirrorlike finish, and carry only the radial loads. Lateral loads are absorbed by a large bronze thrust bearing. This also plays an important part in maintaining full rolling efficiency

in the Fafnir-Melcher design.

Abuse from shock loads is a thing of the past . . . track and wheel noises are effectively deadened . . . vibration is reduced and bearing wear minimized . . . by means of a durable, non-metallic insulating pad. And continuously filtered oil is delivered to all bearing surfaces in the required quantity by the efficient Fafnir-Melcher wick lubrication system.

For longer life, ease of maintenance and reduction in starting effort, you will find the Fafnir-Melcher unexcelled. We welcome an opportunity to show you all of the features in detail.

## Every requirement fulfilled!

1. Ample capacity to carry all loads without heating.
2. Positive lubrication at all speeds and temperatures.
3. Lateral adjustment possible when made necessary by truck wear or distortion.
4. Insulation from shocks and deadening of noise.
5. Interchangeability with A. R. A. equipment
6. Simplicity of installation and maintenance.

## FAFNIR BEARINGS INCORPORATED

General Sales Office and Factory—New Britain, Conn.

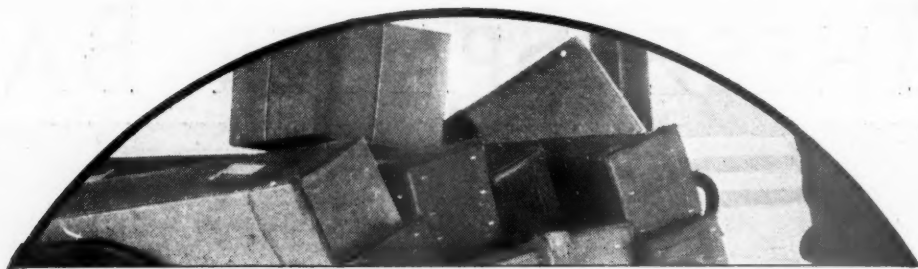
General Sales Office—Western Div. 806 W. Washington Bld., Chicago, Ill.

FAFNIR-MELCHER



Roller Bearings for Car Journals





## fragile . . . *handle with care*

Goodrich Industrials  
cushion the load . . .  
reduce "O.S.&D" claims



**I**S your warehouse a "bottle neck" for fragile merchandise? Do you have to move breakable goods thru it slowly for fear of damage? Maybe your transfer agent prides himself in not having a single major breakage claim during the past year, but if he has to sacrifice speedy handling for caution you are the loser.

Trucks equipped with Goodrich Industrials move all shipments along swiftly, smoothly, and *safely* because these tires are specially compounded to provide maximum cushioning to the load. You go a long way toward eliminating "O. S. & D." claims when you specify Goodrich.

Resilient Goodrich Industrials not only

save the load. They also protect the truck and the floor. Their smooth tread and "free rolling" construction make trucks easier to handle and insure minimum power consumption. They far outlast ordinary rubber tires, too.

That's why Goodrich Industrials are standard equipment on leading makes of industrial trucks. Make sure you specify Goodrich for replacements.

The B. F. Goodrich Rubber Co., Established 1870, Akron, Ohio. Pacific Goodrich Rubber Co., Los Angeles, Calif. In Canada: Canadian Goodrich Company, Ltd., Kitchener, Ontario. The International B. F. Goodrich Corp. (Export).

### *Why* **Goodrich?**

- 1. SPEED**—Smooth tread and "free rolling" construction insure easier handling and minimum power consumption.
- 2. WEAR**—Specially compounded rubber means longer tire life.
- 3. CAPACITY**—Hard rubber plies cemented between the base and the tread permit heavy loads without danger of tearing, cutting or spreading the tire.
- 4. SAFETY**—Exceptional cushioning properties reduce breakage loss. Goodrich Industrials on your trucks insure fewer claims.
- 5. ECONOMY**—Goodrich Industrials reduce depreciation on equipment—lessen damage to floors.



# Goodrich



## *industrial tires*

S P E C I F Y   G O O D R I C H

**REO QUALITY IN THE LOWEST PRICED TRUCK FIELD**

# NEW $1\frac{1}{2}$ TON REO

*... with a wide range of  
Reo bodies to fit your needs*

In the entire field of low price trucks, only the new  $1\frac{1}{2}$ -Ton REO SPEED WAGONS embody all these excelling features:

Powerful 4 and 6 cylinder truck engines with *five* and *seven* bearing crankshafts; maximum piston displacements; full force feed oiling even to the piston pins; chrome nickel cylinders that wear seven times longer; extra large 7" deep frames; full floating rear axles; long, heavy springs; Spoksteel wheels; and large internal, self-equalizing hydraulic brakes!

Wheelbases are longer, with greater loading spaces back of the cab. With this sturdy chassis, Reo is prepared to supply every popular type of panel, stake, express or dump body—also special types for special needs. Prices are low and quality extraordinary.

A drive under load—over test routes of your own choosing—will tell more about the smooth, powerful action of these new

## \$625

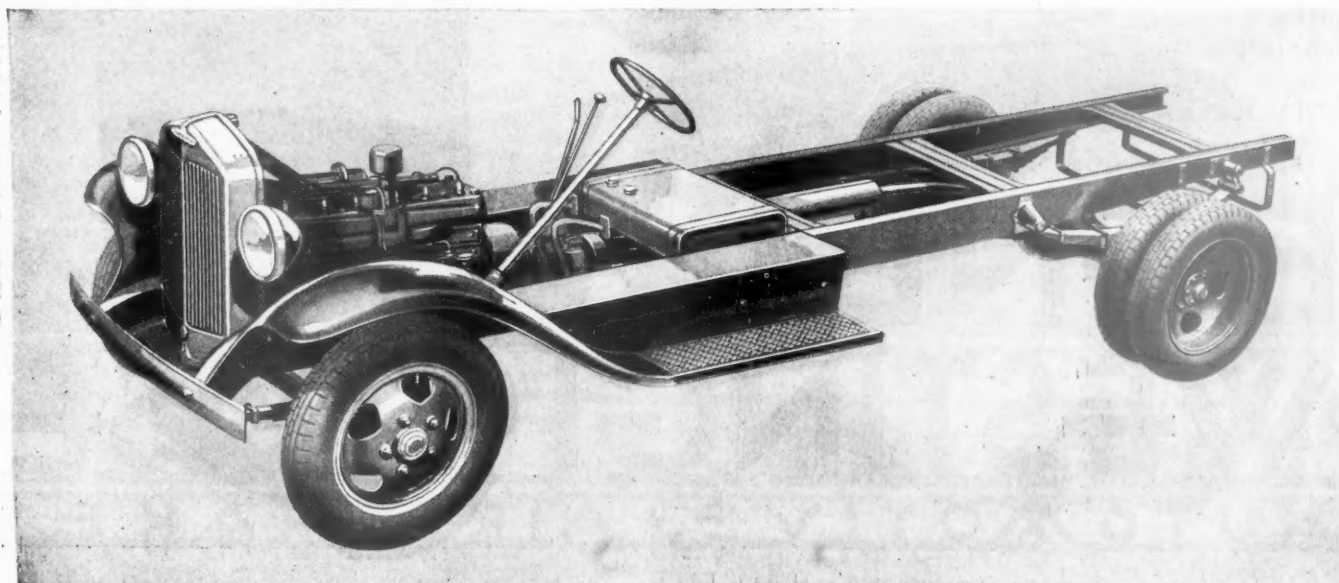
Four-Cylinder \$625, Six-Cylinder \$725  
Chassis f. o. b. Lansing, Michigan  
DUAL WHEELS EXTRA

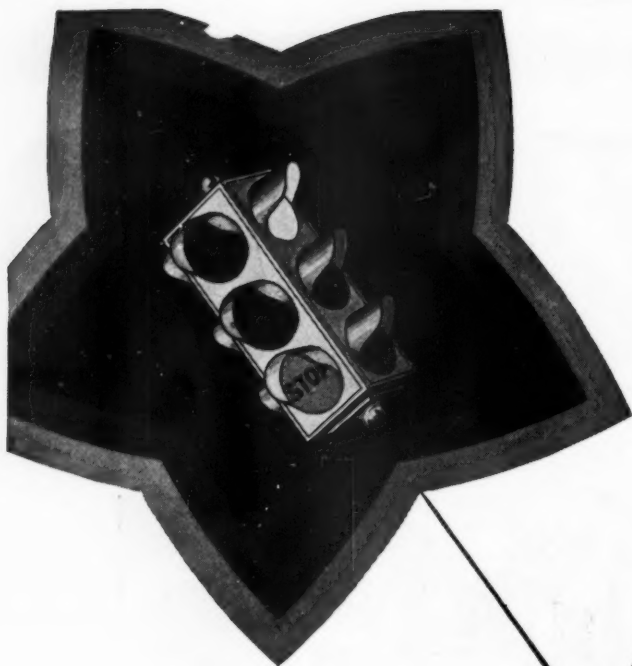
Speed Wagons than words could possibly convey. Note carefully the savings in time and gas—and the *exceptional* size and strength of vital parts.

Any Reo salesman will gladly show you a portfolio which proves, by illustrated life-size comparisons of parts, the real and indisputable margin of Reo superiority.

By all means, see this SPEED WAGON before you buy!

**REO MOTOR CAR COMPANY**  
LANSING - TORONTO

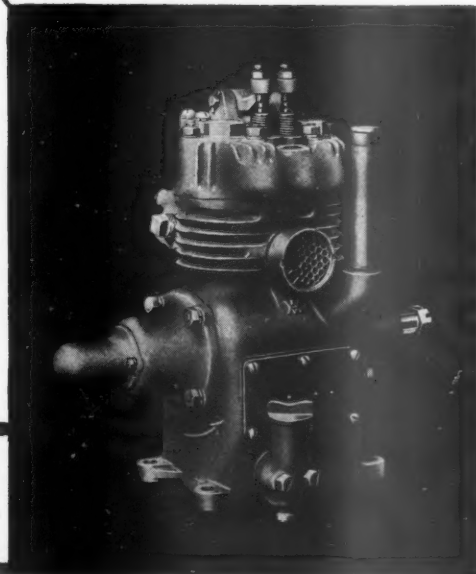




*A thousand times a day ★*

★ Bendix-Westinghouse Automotive Air Brakes lend their sure, quick, tremendous power to the modern, heavy duty highway transport ★ How thoroughly this modern power-to-stop meets the needs of today's coach, truck, tractor and trailer-train is evidenced by its acceptance as standard equipment by a majority of the world's foremost manufacturers ★ Backed by more than a half century's development and manufacture, Bendix-Westinghouse Brakes come to you a time tested product of the world's most exacting laboratory . . . actual service ★ Traditionally trouble-free, the perfect service this modern system of power braking is designed to give, is fortified by a factory reconditioning plan through a nation-wide network of authorized distributors ★ Should you have a question bearing on any phase of modern, heavy duty braking, address your communication to BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE COMPANY at Pittsburgh, Pennsylvania.

6293



**BENDIX ★**  
**WESTINGHOUSE**  
**AUTOMOTIVE ★ AIR ★ BRAKES**





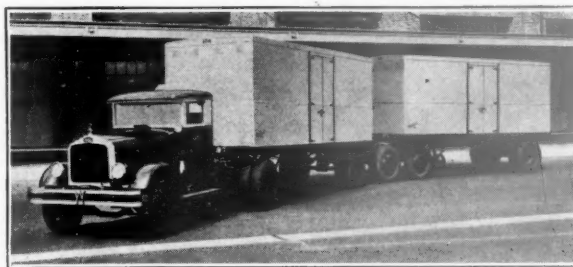
## “The Cranker”

Exposes himself and his employers to danger

Accidents rob the employer, either permanently or temporarily, of some of his best and most capable men. In such cases not only is valuable time lost but the company becomes liable and oftentimes is forced to go to considerable expense to pay claims.

With 100% cab-controlled Lapeer-Trailmobile equipment it is not necessary for the driver to leave his seat in the cab to hook up or uncouple, to apply or release his brakes. The possibility of danger is greatly minimized. With such equipment you avoid costly accidents and at the same time eliminate costly delays—and increase profits.

We shall be glad to demonstrate why Lapeer-Trailmobile equipment is Safer - Faster - Cheaper.



THE TRAILER COMPANY OF AMERICA  
Oakley, Cincinnati, Ohio

“Representatives in Principal Cities”

FULLY AUTOMATIC AND MANUAL SEMI-TRAILERS, FOUR-WHEEL TRAILERS  
POLE TRAILERS AND CARRYALLS

# LAPEER-TRAILMOBILE

“TRAILERIZE AND ECONOMIZE”

The Largest Railroad  
on the Continent

CANADIAN NATIONAL

Cost of Roof Maintenance  
on 30,000 Cars  
Equipped with

DRY LADING ROOFS

18 Years 1913 to 1930 Inclusive-

\$4,519.49

Average Per Year  
for entire 30,000 roofs—\$250.00

Average for 18 Year Period  
per roof—15 cents

Average Per Year  
per roof—less than one cent

Proves Itself the Greatest Economical  
Improvement in Car Construction.



Canton Motor Coach,  
Inc., Canton, Ohio,  
operates 75 city buses  
on Goodyear Tires

## **“More than 50,000 miles ON GOODYEARS”**

Long mileage isn't the only thing it takes to make a good tire for motor coaches. But it's one of the best indications that tires can run without trouble and keep passengers moving on schedule.

That's the case in Canton. "On some lines in our city-wide service, buses have traveled more than 50,000 miles on Goodyears and indications are that these tires are still

good for many more miles. We have had very few road service calls, which is an important feature in building up and retaining the good will of the riding public."

Whether you want safe, sure traction on hills, wet pavements or country roads—whether you want a tire stout enough to stand up under the speed of interstate runs—or a tire to roll out

comfortable transportation on city streets—you'll find operations like yours which get what you want in Goodyears.

Find out why *more people ride on Goodyear Tires than on any other kind*—it's just as true of motor coaches as it is of passenger cars. The next time you order new equipment—specify delivery on Goodyears.

THE GREATEST NAME IN RUBBER

# **GOODYEAR**

**More Tons are Hauled on Goodyear Tires than on any other kind**



**To cut costs**

**To reduce noise**

**To improve service**

**To eliminate smoke**



## **42 G-E equipped locomotives are added by the New York Central**

The electrification of the "West Side" by the New York Central Railroad completes the electrification of all main-line tracks on the Island of Manhattan and marks another important step in the progress of American railroading. Forty-two G-E equipped locomotives\* are used to haul main-line freight from Sixtieth Street northward to Harmon. Each locomotive weighs 133 tons and is capable of hauling a 2250-ton train at 32 miles per hour; and provision is made for the operation of two or three units in multiple in order to handle heavier trains. While these locomotives are designed primarily for freight service, they are also suitable for passenger service and will occasionally be employed for this purpose. Their maximum rated speed is 60 miles per hour.

\* The New York Central Railroad also employs 36 G-E equipped 3-power locomotives (oil-engine-battery-third-rail) for operation south of the Sixtieth Street yard.

JOIN US IN THE GENERAL ELECTRIC PROGRAM, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK  
350-94

# GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

# Protect

## Huge Investments

in

## Modern Power

**T**HE high cost of modern power and present day operating conditions compel every railroad to get the maximum service out of every locomotive at the lowest possible maintenance cost.

Protection against the disastrous results of drifting with vacuum in the cylinders is today an economic necessity.

The ARDCO DRIFTING VALVE prevents a lot of trouble and pays a big return on the investment. It prolongs the life of packing in the valves and cylinders, insures clean ports, reduces back pressure and frictional resistance, protects superheater units, reduces wear on reciprocating parts, valve gear and driving boxes.

Application of ARDCO SAFETY CYLINDER COCKS will save you many thousands of dollars. They *open automatically* whenever the cylinder pressure exceeds the boiler pressure due to compression or condensation, thus preventing damage to the heads, packing, rods, etc.

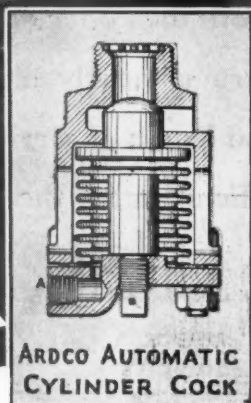
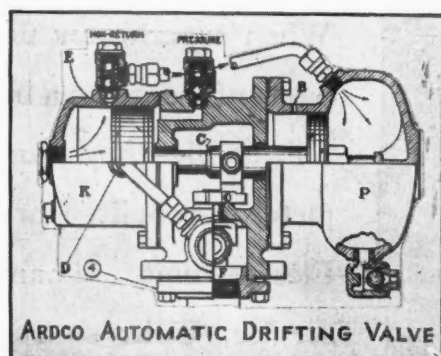
Why take chances with modern power when it can be protected against many expensive failures for less than one-third of one per cent on the investment?

*Blue prints and detailed information upon request*

**ARDCO MANUFACTURING CO.**

1 Newark St.

Hoboken, N. J.




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# Ardco Railway Devices

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# HOW MUCH Do YOU SPEND.....

on boiler repairs, such as side sheets, flue sheets and flues . . . . over a period of ten years? Has it ever occurred to you that your superheater units are in the boiler all that time and subjected to the same and even more severe service? Do you give them the same deal? Do you

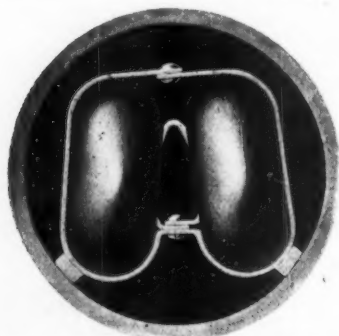
spend as much in proportion on superheater units as you do on the boiler?

They too require, not merely repairs, but careful *rebuilding*, because of the importance of their part not alone in boiler efficiency, but in engine *efficiency* also.



When superheater units are in need of repair or become un-serviceable they can be completely rebuilt through the Elesco unit remanufacturing service. Units so rehabilitated are equivalent to new units, having been built-up to full size dimensions and areas. They in-

sure against restriction to steam and gas flow — a condition that would materially affect both the boiler and engine efficiency. They are so nearly like new units in the kind and length of service they render, that it is difficult to tell the difference.



Cross-Section of Flue Showing  
Elesco Remanufactured Unit

## THE SUPERHEATER COMPANY

60 East 42nd Street  
NEW YORK



Peoples Gas Building  
CHICAGO

Canada: The Superheater Company, Limited, Montreal

Superheaters

Feed Water Heaters

Superheated Steam Pyrometers

Exhaust Steam Injectors

A-614



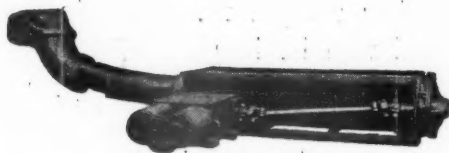


## A Guarantee Of Economy and Dependability

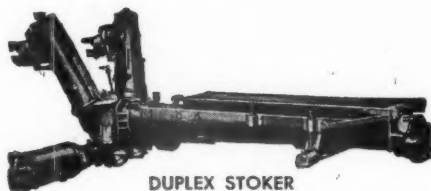
**I**N their present form, Standard Stokers represent thousands of dollars invested, not only in developing and perfecting the fundamental idea, but in determining by service and test, the materials used in various parts most suitable for the service intended and in the developing of jigs and fixtures that insure interchangeability, proper working, long life and above all dependability of service.



TYPE "B" STOKER




TYPE "B-K" STOKER



DUPLEX STOKER

For maximum economy and reliability, it is essential that this be so. Absolute interchangeability saves shop time and labor in assembling — there is no shop fitting with Standard Stoker parts. It assures alignment of each part and minimum wear on each moving part. It assures reliability and safeguards against road failures and expensive detentions.

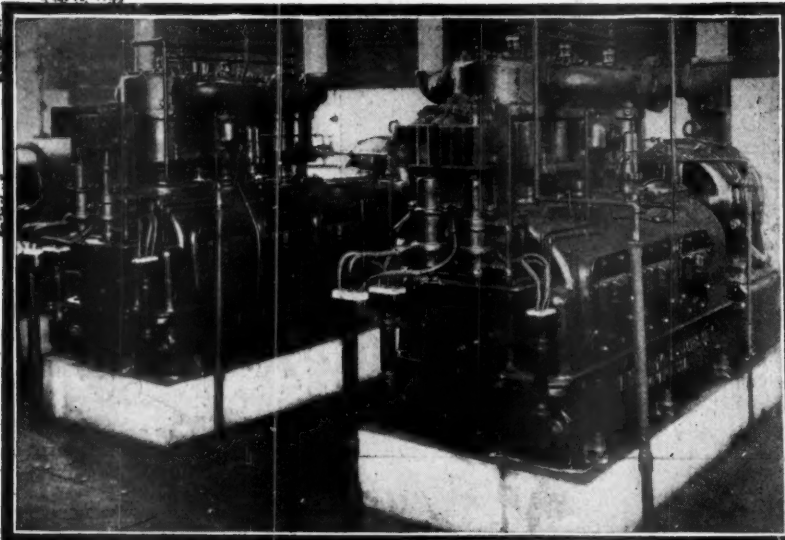
For certainty of performance and economy of service, specify Standard Stoker replacement parts identified by the registered trademark . It is your guarantee of maximum trouble free service.

# THE STANDARD STOKER COMPANY, Inc.

NEW YORK

CHICAGO

ERIE



## *a* *"baker's dozen"* in AIR COMPRESSOR VALUE

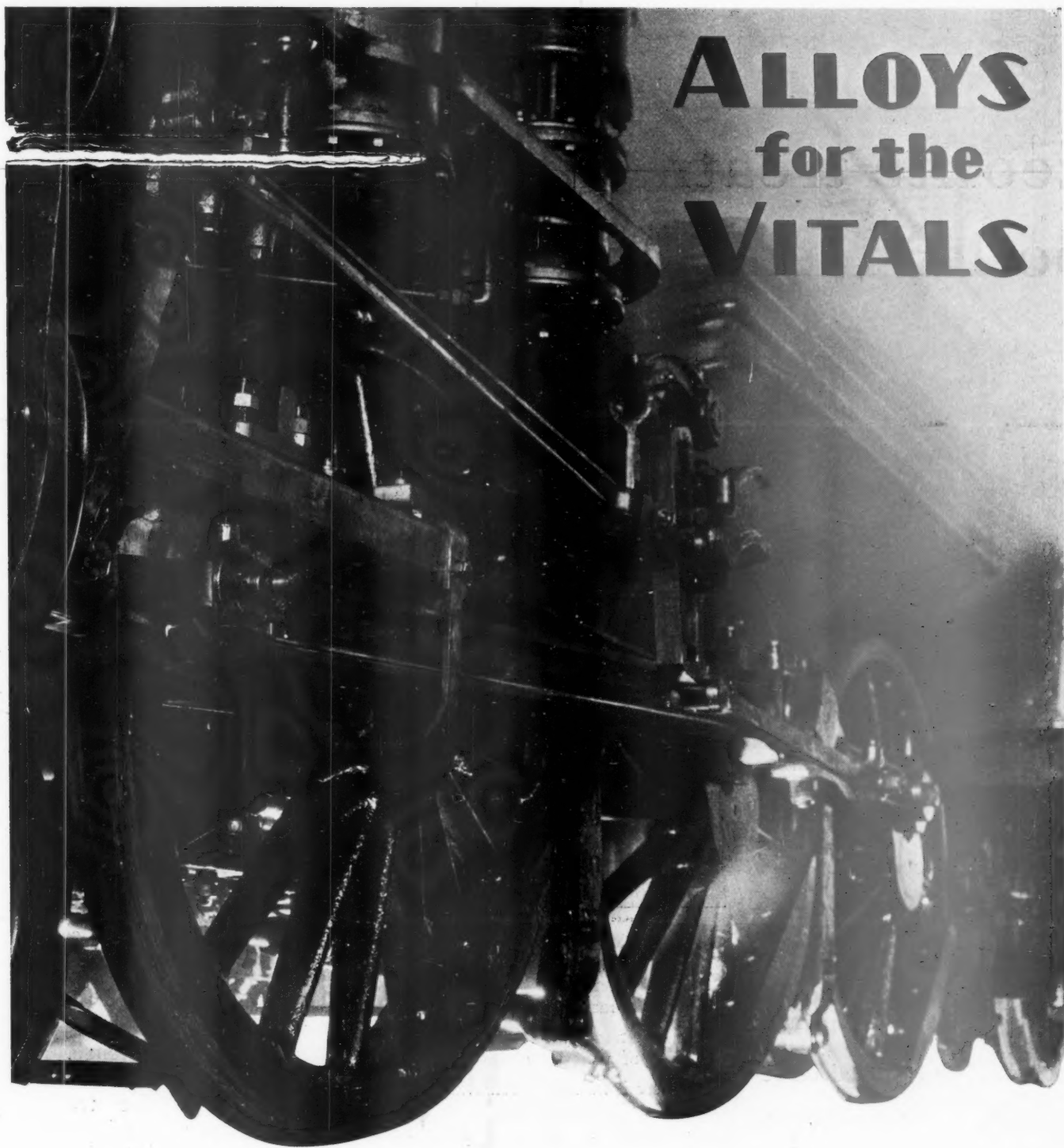
JUST as the old time baker threw in an extra bun for good measure, so the builders of Westinghouse-National Air Compressors add extra value to the machines they build . . . . They save valuable space for the user by designing compact machines that are driven direct by the motor or through efficient herring-bone gearing . . . they save installation cost by making complete self-contained machines that need no elaborate foundation nor require extensive auxiliary apparatus . . . they save operating expense by providing complete Automatic Control of distinctive type—which insures that the power consumed will be in proportion to the air compressed . . . they save maintenance expense by building durable machines that will operate for a score of years with minimum time and material for attention and upkeep—thus maintaining the noteworthy tradition of "Quality Machines for Quality Service" . . . Sizes range from  $2\frac{1}{2}$  to 700 cu. ft. displacement—for shops, yards, car retarders, signals, etc.

WESTINGHOUSE AIR BRAKE CO.

General Office and Works

Wilmerding, Pa.

WESTINGHOUSE—  
NATIONAL  
AIR COMPRESSORS



# ALLOYS for the VITALS

THEY'VE seen thousands of miles of severe punishment — these vitals pictured above . . . and have never been shopped for repairs. They are the crossheads, the centers of the drivers, the main frames, top frame rails and the tender truck frames. Much rail-roading may be expected of them—for they bear the mark of a Birdsboro alloy casting steel . . . a grade whose perfection was a resultant of demand . . . an analysis that guarantees a greater safety factor than any working stress imposed.

And in addition—Birdsboro-30 retains properties that resist the agents of *corrosion-fatigue* . . . We emphasize these points of superiority in a bulletin on alloy casting steels.

## BIRDSBORO

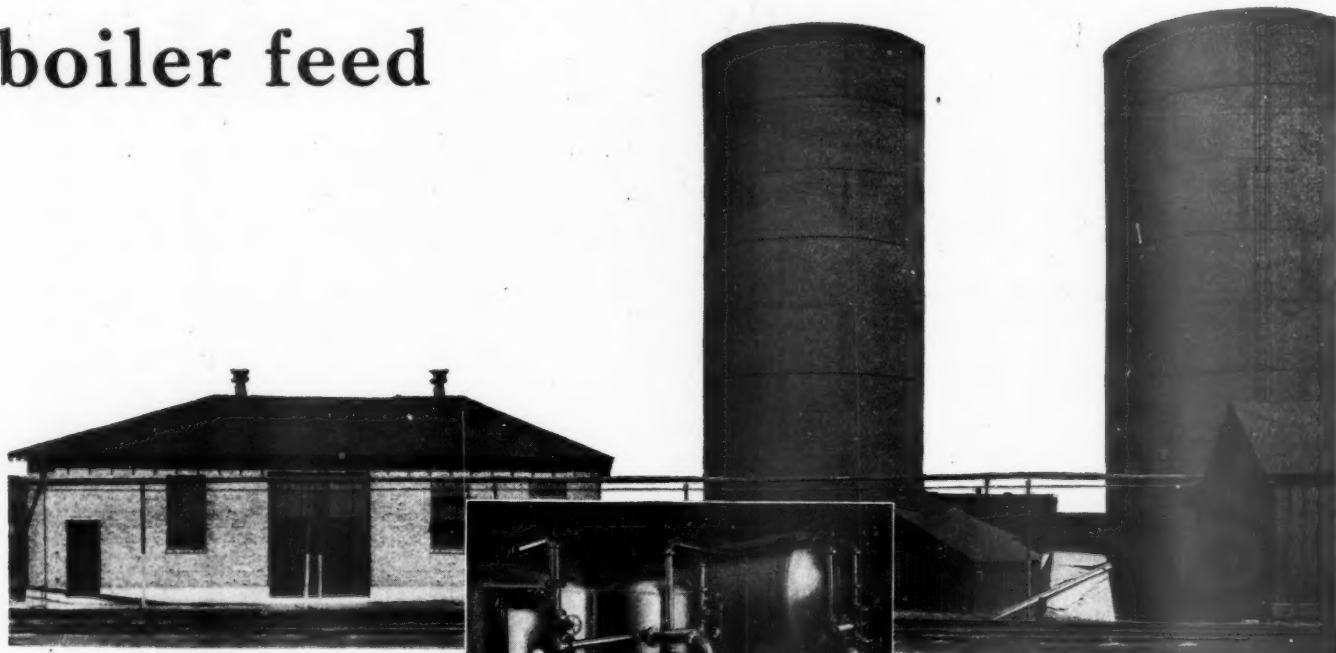
STEEL FOUNDRY AND MACHINE COMPANY

DESIGNERS AND BUILDERS

BIRDSBORO, PENNSYLVANIA



# 7 advantages of zeolite treatment for locomotive boiler feed



**I**N ITS printed report an association committee stated that zeolite treatment has a place as one of the *important* methods of locomotive water softening.

This method, according to the committee, is one which should always be considered before making a definite decision as to the type of plant to be used. (Name and date of report will be supplied on request.)

The zeolite method has come to the forefront chiefly because of these 7 advantages:

- (1) It absolutely prevents the formation of scale and sludge in locomotive boilers.
- (2) Regardless of fluctuations in composition of raw water, it will produce water that is free of scale-forming materials.
- (3) Under-treatment or over-treatment of water is eliminated.
- (4) There is no sludge removal problem.
- (5) There are no alkaline chemicals to be handled—no dusts.
- (6) Less space is required—plant can usually be located in an existing building.
- (7) Permutit Zeolite Water Softeners can be operated by unskilled labor. A pumper, agent, porter or other employee can regenerate it as part of his regular job.

From his own experience, a railroad man has set forth the advantages of zeolite treatment in a paper that is now available in reprint form. Write for a copy — "Soft Water for Railroads." No obligation.

# Permutit

*Water Treating Equipment*

THE PERMUTIT COMPANY

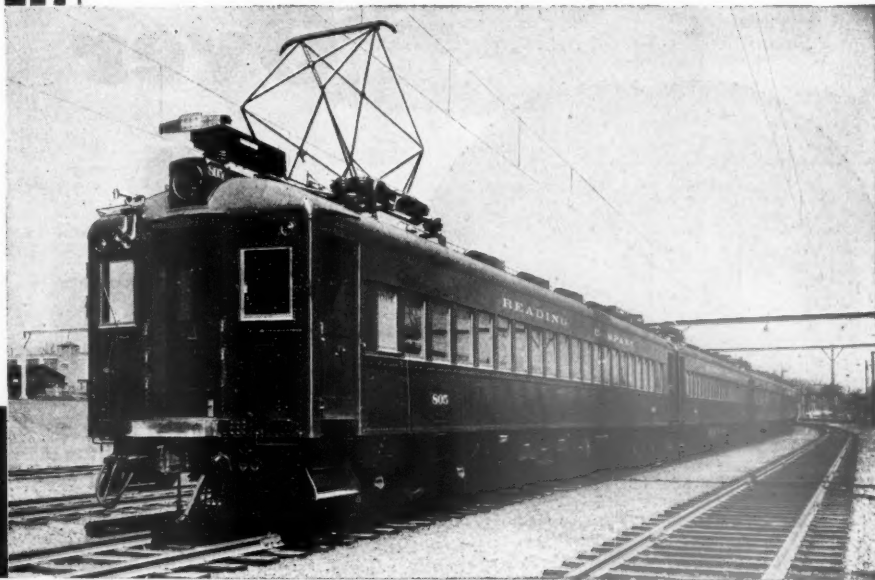
440 FOURTH AVENUE, NEW YORK, N. Y.

Manufacturers of all types of Zeolite, Hot and Cold Lime Soda, Lime-Barium Water Softeners—Sand Filters—Iron, Oil and Manganese Removing Filters—Continuous Boiler Blow-off Equipment—Ranarex CO<sub>2</sub> Indicators and Recorders—Other Power Plant and Water Treating Specialties.

TWENTY-THREE SALES OFFICES THROUGHOUT THE UNITED STATES

*"Comfort to the passengers, speed and ease of operation, elimination of weight, reduction of maintenance costs, accessibility and reliability of apparatus are the things which were kept in mind in the design of this car equipment."*—G. I. Wright, Chief Electrical Engineer, Reading Company—April 25, 1931 Issue,

Railway Age.



One of the Reading's New 11,000-volt, Single-phase Multiple-unit Trains.

## *The* READING completes the initial link in its chain of suburban electrification

**W**ESTINGHOUSE congratulates the Reading Company on the inauguration of its electrified suburban service.

This electrification constitutes the most modern and up-to-date suburban service to be placed in operation in this country. The selection by Reading officials of the equipment for this major operation is further evidence of the reliability of Westinghouse equipment and the superiority of the single-phase system.

Some of the major items of Westinghouse equipment are:

*Traction motors for multiple-unit cars.*

*Control equipment for multiple-unit cars.*

*Gearing equipment for multiple-unit cars.*

*Current collecting equipment for multiple-unit cars.*

*Bus line connectors for multiple-unit cars.*

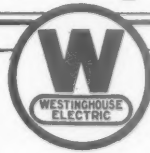
*Visicode supervisory control for remote manipulation of substation switching.*

*Switchboards for substations.*

*Service, prompt and efficient, by a coast-to-coast chain of well-equipped shops*

# Westinghouse

T 31887



# Serving The Railroads

*Ashton Locomotive Master Pilot  
Steam Gage—No. 62 BB Style*



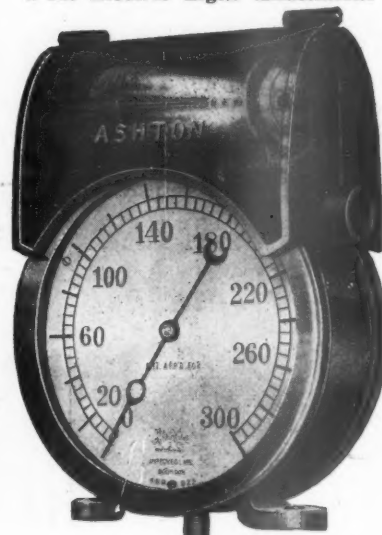
Patents Pending

THE ASHTON NO. 62 BB STYLE LOCOMOTIVE MASTER PILOT GAGE is constructed with special dial having two circles of pressure graduations. The outer circle records pressures from 190 to 210 pounds and the inner circle records the full range of pressure from 0 to 400 pounds. With the wide coarse graduations on the outer circle of the dial the engineman may easily detect the slightest fluctuation within the range of the working pressure.

## Over 60 Years

DURING all this exceptionally long industrial career, every product manufactured by the ASHTON VALVE CO. has successfully met the most exacting railroad requirements.

*Ashton Locomotive Double Dial  
Steam Gage—No. 52 D.I.A.  
With Electric Light Attachment*



Patent Applied For

THE ASHTON LOCOMOTIVE DOUBLE DIAL STEAM GAGE eliminates the need of separate boiler pressure gages for engineer and fireman on large oil-burning locomotives and those having large fireboxes extending back into the cabs. The dials of the 52 D.I.A., are illuminated by a lamp contained in a housing attached to the gage case, and light is reflected down in a way which does not interfere with the vision of the enginemen. When desired, the Gage is furnished without lighting attachment and is then called No. 52D.

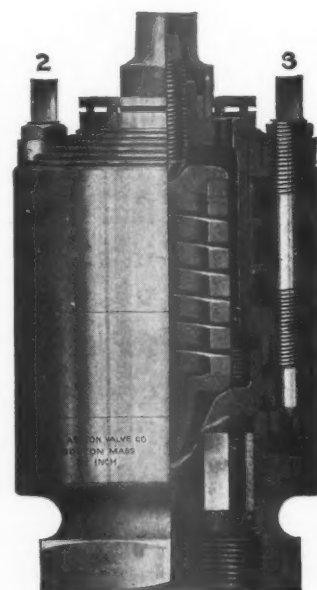


Patented

*Ashton Locomotive Duplex Back  
Pressure Gage with Electric Light  
Attachment—No. 62 BAI Style*

The No. 62 BAI Style is fitted with an electric light attachment. The illumination of the dial is accomplished by an electric light enclosed in a special hood which prevents the diffusion of the light rays over other parts of the cab. Electric light attachment may also be applied to other style gages illustrated.

THE ASHTON NO. 28 MM OPEN POP and the NO. 30 MM MUFFLER SAFETY VALVES are constructed strictly in accordance with the recommended practice of the Committee on Safety Valves of the American Railway Master Mechanics' Association, 1912. They require no special wrenches, there are no rings or sleeves to be raised or lowered. They have no outside casings to move that may be damaged by wrenches in removing or applying the valves.



*Ashton No. 30 MM Style  
Muffler Safety Valve*

## The Ashton Valve Company

BOSTON

NEW YORK

CHICAGO

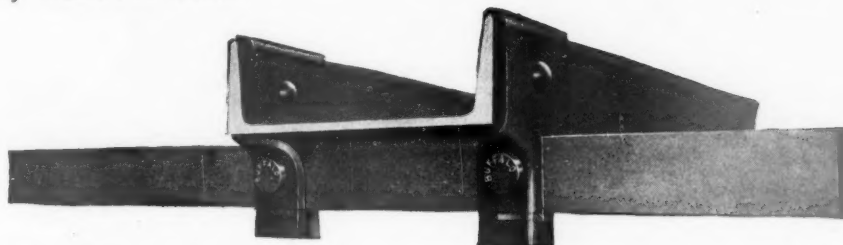
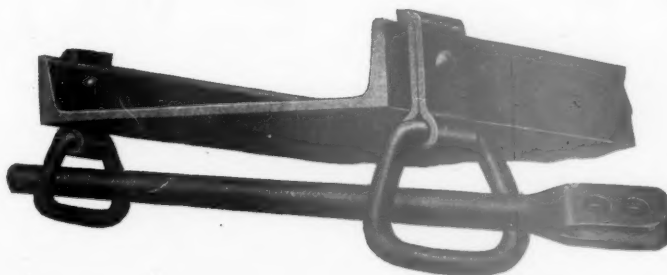
SAN FRANCISCO



## THE "BUFFALO"

### BOTTOM ROD SUPPORT

Meeting all requirements and tests.  
 Loop held by friction.  
 Obstructions swing it clear.  
 No bending or binding  
 Permitting free brake movement.  
 Folds up for channel removal.  
 Made to fit any channel or bolster.



## THE "BUFFALO" AUXILIARY SUPPORT FOR BRAKE BEAMS

Meeting all requirements and tests.  
 Simple and rugged design.  
 Economical application.  
 Two pin, quick removal of sliding bar.  
 Made to fit any channel or bolster.

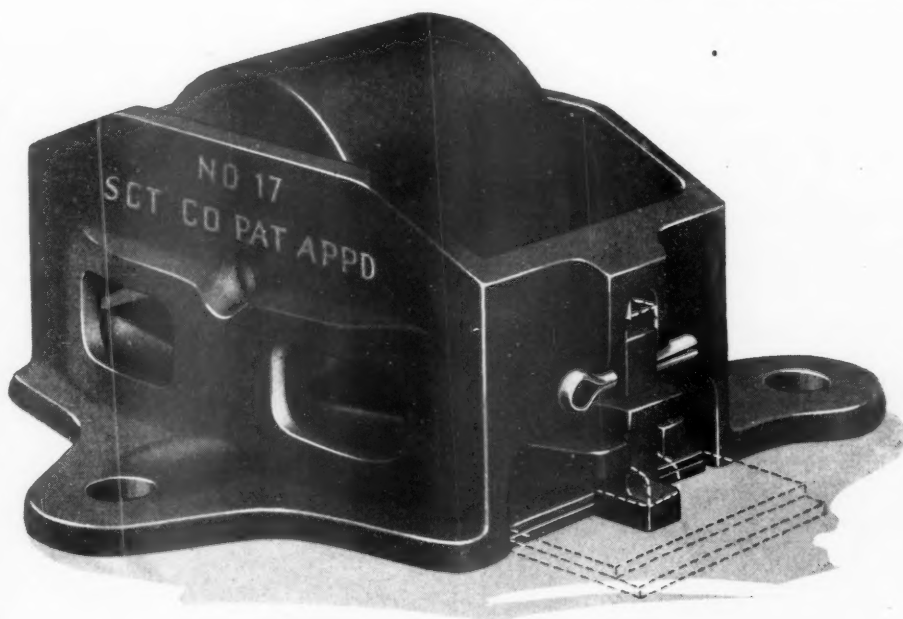
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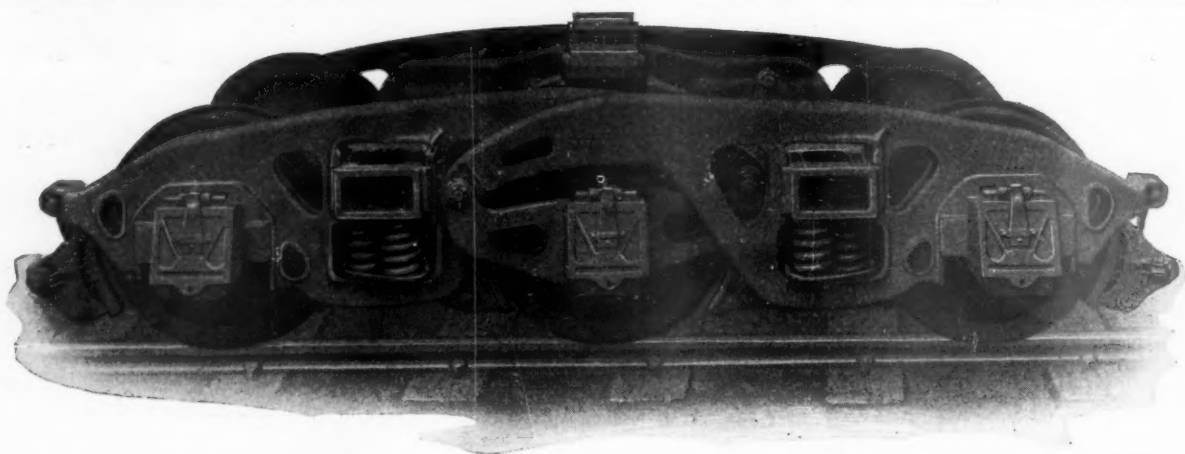
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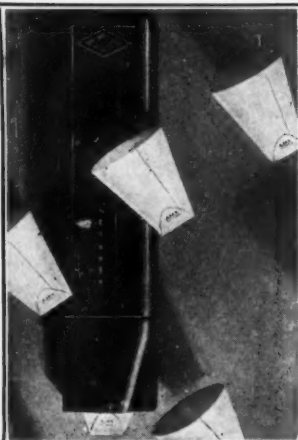


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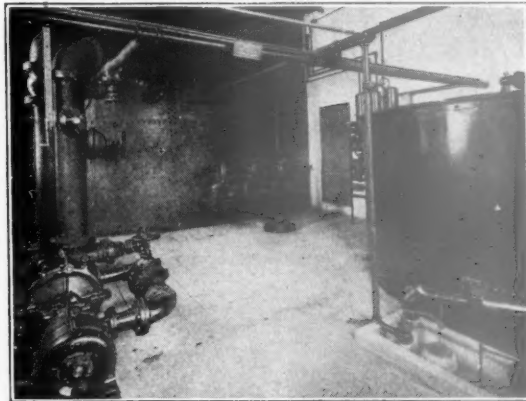
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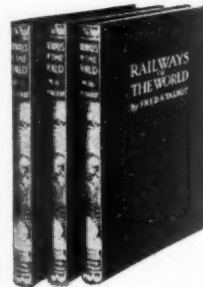


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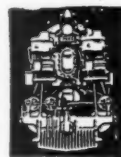
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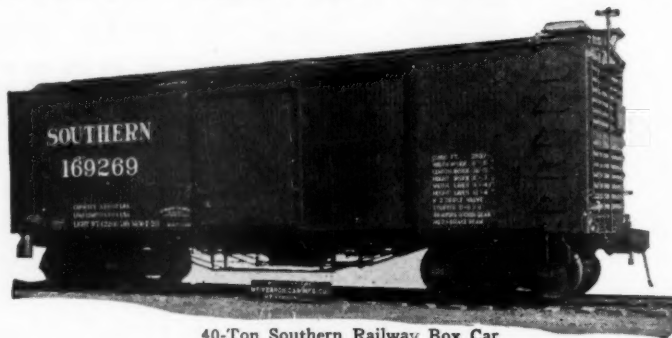
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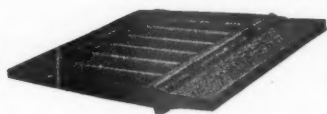
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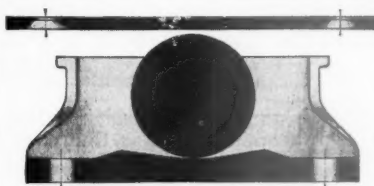
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Westinghouse Elec. & Mfg. Co. <b>Cars, Spreader.</b> Western Wheeled Scraper Co. <b>Cars, Tank.</b> Bethlehem Steel Co. General American Tank Car Corp. Indian Refining Co. Pressed Steel Car Co. <b>Cars, Dump.</b> Western Wheeled Scraper Co. <b>Castings, Alloy Steel.</b> Symington Co., The. Union Spring & Mfg. Co. <b>Castings, Brass and Bronze.</b> Baldwin Locomotive Works. The. General Railway Signal Co. Magnus Co., Inc. National Bearing Metals Corp. Union Switch & Signal Co. <b>Castings, Gray Iron.</b> American Brake Shoe & Foundry Co. American Locomotive Co. Baldwin Locomotive Works. General Railway Signal Co. Mt. Vernon Car Mfg. Co. Ramapo Ajax Corp. Union Switch & Signal Co. <b>Castings, Gun Iron.</b> Hunt-Spiller Mfg. Corp. <b>Castings, Iron &amp; Steel.</b> Baldwin Locomotive Works. The. Industrial Brownhoist Corp. <b>Castings, Malleable Iron.</b> Buckeye Steel Castings Co. Chicago Railway Equipment Co. Fort Pitt Malleable Iron Co. National Malleable & Steel Castings Co. P & M Company, The. Pressed Steel Car Co. Symington Co., The. Universal Draft Gear Attachment Co. <b>Castings, Monel Metal.</b> International Nickel Co., The. <b>Castings, Steel.</b> Allegheny Steel Co. American Locomotive Co. American Steel Foundries. Bethlehem Steel Co. Bettendorf Co., The. Birdsboro Steel Foundry & Mach. Co. Buckeye Steel Castings Co. General Steel Castings Corp. Gould Coupler Co., The. McConway & Torley Co. Midvale Co., The. National Malleable & Steel Castings Co. Pressed Steel Car Co. Standard Steel Works Co. Union Spring & Mfg. Co. Union Steel Casting Co. Universal Draft Gear Attachment Co. <b>Castings, Steel Loco.</b> Birdsboro Steel Foundry & Machine Co. General Steel Castings Corp. Gould Coupler Co., The.	Ohio Steel Foundry Co., The. Standard Steel Works Co. Union Steel Casting Co. <b>Castings, Steel Vanadium.</b> Birdsboro Steel Foundry & Machine Co. Brill Co., The J. G. Ohio Steel Foundry Co., The. Standard Steel Works Co. Union Steel Casting Co. <b>Catchbasins, Iron.</b> Armco Culvert Mfrs. Assoc. <b>Cellers, Engine Truck.</b> Ardco Mfg. Co. <b>Cement Car, Asphalt.</b> Lehon Co., The. Sherwin-Williams Co. <b>Cement, High Temperature.</b> Carey Co., Philip, The. Johns-Manville Corp. <b>Cements, Asbestos and Magnesia.</b> Carey Co., Philip, The. <b>Center Plates—(See Bearings, Center).</b> <b>Center Sills.</b> Bettendorf Co., The. Bradford Corporation. <b>Chain, Monel Metal.</b> International Nickel Co., The. <b>Chemicals.</b> Bird-Archer Co., The. Dearborn Chemical Co. Hunt Co., Robert W. <b>Chemicals, Boiler.</b> Bird-Archer Co., The. Dearborn Chemical Co. <b>Chemicals, Cleaning.</b> Oakite Products, Inc. <b>Chemists.</b> Bird-Archer Co., The. Dearborn Chemical Co. Hunt Co., Robert W. Pittsburgh Testing Laboratory. <b>Chromium Plating.</b> Worthington Pump & Machinery Corp. <b>Chucks, Lathe.</b> Ryerson & Son, Jos. T. <b>Cinder Handling Plants.</b> Roberts & Schaefer Co. <b>Circuit Breakers.</b> General Electric Co. Union Switch & Signal Co. Westinghouse Elec. & Mfg. Co. <b>Clamps, Forging.</b> Ryerson & Son, Jos. T. <b>Clamps, Guard Rail.</b> O. & C. Co., The. Westinghouse Air Brake Co. <b>Clamps, Hose.</b> Ingersoll-Rand Co. National Malleable & Steel Castings Co. Vapor Car Heating & Lighting Co. Westinghouse Air Brake Co. <b>Clamps, Pipe.</b> Franklin Railway Supply Co., Inc. National Malleable & Steel Castings Co. <b>Clamps, Rail Cutting.</b> Oxweld Railroad Service Co., The. <b>Classification Yard Systems.</b> General Railway Signal Co. Union Switch & Signal Co. <b>Cleaners, Aircraft.</b> Oakite Products, Inc. <b>Cleaners, Air Pump.</b> Oakite Products, Inc. Westinghouse Air Brake Co. <b>Cleaners, Bus &amp; Truck.</b> Oakite Products, Inc. <b>Cleaners, Car.</b> Oakite Products, Inc. <b>Cleaners, Flue.</b> Ryerson & Son, Jos. T. <b>Cleaners, General.</b> Oakite Products, Inc. <b>Cleaners, Locomotive.</b> Oakite Products, Inc. <b>Cleaners, Metal.</b> Oakite Products, Inc. <b>Clips, Wire Rope.</b> American Steel & Wire Co. <b>Coach and Coach Yard Steam Joints—(See Joints, etc.).</b> <b>Coaches, Motor.</b> American Car & Foundry Motors Co. Dodge Motor Truck Corp.	International Harvester Co. White Co., The. <b>Coaches, Second-Hand.</b> Hyman-Michaels Co. <b>Coal, Ore &amp; Ash Handling Machinery.</b> Industrial Brownhoist Corp. Milwaukee Electric Crane & Hoist Corp. Orton Crane & Shovel Co. Roberts & Schaefer Co. <b>Coal Pushers.</b> Standard Stoker Co. <b>Coaling Stations.</b> American Bridge Co. Fairbanks-Morse & Co. Roberts & Schaefer Co. <b>Cocks, Angle.</b> Westinghouse Air Brake Co. <b>Cocks, Blow-Off.</b> Bird-Archer Co., The. <b>Cocks, Cylinder.</b> Prime Manufacturing Co., The. <b>Columns, Water.</b> Prime Manufacturing Co., The. <b>Combination Crane Pile Drivers.</b> Industrial Brownhoist Corp. <b>Compounds, Boiler.</b> Dearborn Chemical Co. Bird-Archer Co., The. <b>Compounds, Cleaning.</b> Oakite Products, Inc. <b>Compounds, Cutting.</b> Oakite Products, Inc. <b>Compounds, Grinding.</b> Oakite Products, Inc. <b>Compounds, Paint Removing.</b> Oakite Products, Inc. <b>Compounds, Rust Proofing.</b> Oakite Products, Inc. <b>Compressors, Air.</b> Ingersoll-Rand Co. New York Air Brake Co. Westinghouse Air Brake Co. Worthington Pump & Machinery Corp. <b>Concrete Floor Slabs.</b> Federal American Cement Tile Co. <b>Concrete Reinforcement.</b> American Steel & Wire Co. Carnegie Steel Co. Ryerson & Son, Jos. T. <b>Concrete Roofing, Tile.</b> Federal American Cement Tile Co. <b>Condensers.</b> Ingersoll-Rand Co. <b>Condensing Apparatus.</b> Ingersoll-Rand Co. Worthington Pump & Machinery Corp. <b>Conduit, Rigid.</b> Aluminum Co. of America. <b>Conduits, Metallic Flexible.</b> Barco Mfg. Co. Franklin Railway Supply Co., Inc. Graybar Electric Co. Vapor Car Heating Co., Inc. <b>Conduit, Underground.</b> Graybar Electric Co. Johns-Manville Corp. <b>Connections, Lever.</b> National Malleable & Steel Castings Co. <b>Connections, Truck.</b> National Malleable & Steel Castings Co. <b>Connections, Truck Lever.</b> Schaefer Equipment Co. <b>Contraction Joint.</b> General Railway Signal Co. <b>Control Devices, Train Speed.</b> Union Switch & Signal Co. <b>Control, Locomotive.</b> Valve Pilot Co. <b>Controllers, Electric.</b> General Electric Co. Westinghouse Electric & Mfg. Co. <b>Conveying Machinery.</b> American Bridge Co. Industrial Brownhoist Corp. Milwaukee Electric Crane & Hoist Corp. Orton Crane & Shovel Co.	Corrugated Sheet. Aluminum Co. of America. <b>Conveyor, Ash—(See Coal, Ore and Ash Handling Mach.).</b> <b>Coupler Pockets—(See Draft Yokes).</b> <b>Coupler Yokes.</b> Bettendorf Co., The. Gould Coupler Co. Symington Co., The. <b>Couplers.</b> American Steel Foundries. Buckeye Steel Castings Co. Franklin Railway Supply Co., Inc. Gould Coupler Co., The. McConway & Torley Co. National Malleable & Steel Castings Co. Standard Coupler Co. Westinghouse Air Brake Co. <b>Couplings, Hose.</b> Fort Pitt Malleable Iron Co. <b>Gold Car Heating &amp; Lighting Co.</b> Ingersoll-Rand Co. Vapor Car Heating Co., Inc. Westinghouse Air Brake Co. <b>Cranes, Ballast Cleaning.</b> American Hoist & Derrick Co. <b>Cranes, Barge.</b> Industrial Brownhoist Corp. Ohio Locomotive Crane Co. <b>Cranes, Bracket.</b> Shepard-Niles Crane & Hoist Corp. <b>Cranes, Crawler.</b> American Hoist & Derrick Co. Industrial Brownhoist Corp. Orton Crane & Shovel Co. <b>Cranes, Crawling Shovels and Draglines.</b> Industrial Brownhoist Corp. Orton Crane & Shovel Co. <b>Cranes, Diesel.</b> Industrial Brownhoist Corp. Ohio Locomotive Crane Co. <b>Cranes, Electric Traveling.</b> Industrial Brownhoist Corp. Milwaukee Electric Crane & Hoist Corp. <b>Cranes, Gantry.</b> Industrial Brownhoist Corp. Milwaukee Electric Crane & Hoist Corp. Ohio Locomotive Crane Co. Orton Crane & Shovel Co. Shepard-Niles Crane & Hoist Corp. <b>Cranes, Gasoline.</b> Industrial Brownhoist Corp. Ohio Locomotive Crane Co. <b>Cranes, Grab Bucket.</b> Milwaukee Electric Crane & Hoist Corp. <b>Cranes, Handpower.</b> Industrial Brownhoist Corp. Shepard-Niles Crane & Hoist Corp. <b>Cranes, Jib.</b> Industrial Brownhoist Corp. Milwaukee Electric Crane & Hoist Corp. Worthington Pump & Machinery Corp. <b>Cranes, Locomotive.</b> Industrial Brownhoist Corp. Ohio Locomotive Crane Co. Orton Crane & Shovel Co. <b>Cranes, Overhead.</b> Industrial Brownhoist Corp. Milwaukee Electric Crane & Hoist Corp. Shepard-Niles Crane & Hoist Corp. <b>Cranes, Pillar.</b> Industrial Brownhoist Corp. Milwaukee Electric Crane & Hoist Corp. <b>Cranes, Portable.</b> Orton Crane & Shovel Co.
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<p><b>Cranes, Transfer.</b> Industrial Brownhoist Corp. Milwaukee Electric Crane &amp; Hoist Corp.</p> <p><b>Cranes, Traveling.</b> Milwaukee Electric Crane &amp; Hoist Corp. Shepherd-Niles Crane &amp; Hoist Corp.</p> <p><b>Cranes, Wharf.</b> Industrial Brownhoist Corp. Ohio Locomotive Crane Co.</p> <p><b>Cranes, Wrecking.</b> Industrial Brownhoist Corp. Orton Crane &amp; Shovel Co.</p> <p><b>Crank Pins — (See Pins, Crank).</b></p> <p><b>Creosote.</b> American Creosoting Co. Century Wood Preserving Co. International Creosoting &amp; Constr. Co. National Lumber &amp; Creosoting Co.</p> <p><b>Creosote, Wood Preservative Treatment.</b> Century Wood Preserving Co. National Lumber &amp; Creosoting Co.</p> <p><b>Cribbing Units.</b> Federal American Cement Tile Co.</p> <p><b>Cross Arms, Treated.</b> American Creosoting Co. Century Wood Preserving Co. Curtin-Howe Corp. Graybar Electric Co. International Creosoting &amp; Construction Co. National Lumber &amp; Creosoting Co. Southern Wood Preserving Co.</p> <p><b>Cross Ties, Treated.</b> American Creosoting Co. Century Wood Preserving Co. Curtin-Howe Corp. International Creosoting &amp; Construction Co. National Lumber &amp; Creosoting Co. Southern Wood Preserving Co.</p> <p><b>Cross Ties, Steel.</b> Bethlehem Steel Co.</p> <p><b>Crossheads &amp; Shoes.</b> Baldwin Locomotive Wks. Barco Mfg. Co. International Creosoting &amp; Construction Co.</p> <p><b>Crossing Signals &amp; Signs.</b> Railroad Supply Co.</p> <p><b>Crossings—(See Frogs and Crossings).</b></p> <p><b>Crossings, Pavement.</b> Carey Co., The Philip.</p> <p><b>Crushers, Coal.</b> American Sheet &amp; Tin Plate Co. Orton Crane &amp; Shovel Co.</p> <p><b>Culverts.</b> Armco Culvert Mfrs. Assoc. Republic Steel Corp. Tonnin Culvert Manufacturers' Association.</p> <p><b>Culverts, Corrugated Iron.</b> Armco Culvert Manufacturers' Association. Republic Steel Corp.</p> <p><b>Culverts, Part Circle.</b> Armco Culvert Manufacturers' Association.</p> <p><b>Culverts, Treated.</b> Century Wood Preserving Co. National Lumber &amp; Creosoting Co. Southern Wood Preserving Co.</p> <p><b>Cups, Oil.</b> New York Air Brake Co. Prime Manufacturing Co., The. Westinghouse Air Brake Co.</p> <p><b>Curtains &amp; Fixtures, Car Window.</b> Pantasote Co., Inc., The.</p> <p><b>Curtain Material, Car.</b> Ryerson &amp; Son, Jos. T.</p> <p><b>Curtains, Cab.</b> Lehon Co., The.</p>	<p><b>Cutting and Welding Apparatus.</b> Oxweld Railroad Service Co. Westinghouse Electric &amp; Mfg. Co.</p> <p><b>Cut-Off Indicators and Recorders.</b></p> <p><b>Cylinder Parts, Finished and Rough.</b> National Tube Co. Valve Pilot Co.</p> <p><b>Cylinders, Air Brake.</b> Westinghouse Air Brake Co.</p> <p><b>Cylinders, Cast Steel Locomotive.</b> General Steel Castings Corp. Union Steel Casting Co.</p> <p><b>Cylinders, Oxy-Acetylene.</b> Oxweld Railroad Co., The.</p> <p><b>Deoxidizers.</b> Q &amp; C Co., The. Vanadium Corp. of America.</p> <p><b>Derricks.</b> Industrial Brownhoist Corp.</p> <p><b>Diesel Electric Power Plants.</b> Fairbanks-Morse &amp; Co. Westinghouse Elec. &amp; Mfg. Co.</p> <p><b>Dirt Collectors.</b> New York Air Brake Co. Westinghouse Air Brake Co.</p> <p><b>Disinfectants.</b> West Disinfecting Co.</p> <p><b>Dispatching Systems.</b> General Railway Signal Co. Union Switch &amp; Signal Co.</p> <p><b>Ditching Machinery.</b> Industrial Brownhoist Corp. Orton Crane &amp; Shovel Co.</p> <p><b>Door Fixtures — (See Fixtures, Car Door).</b></p> <p><b>Doors, Car.</b> Camel Sales Co. Chicago Railway Equipment Co. Miner, W. H. Wine Railway Appliance Co.</p> <p><b>Doors, Locomotive Firebox.</b> Franklin Railway Supply Co., Inc.</p> <p><b>Doors, Rolling, Steel.</b> Kinnear Mfg. Co.</p> <p><b>Draft Arms.</b> American Steel Foundries. Birdsboro Steel Foundry &amp; Machine Co. Bradford Corporation. Symington Co., The. Universal Draft Gear Attachment Co.</p> <p><b>Draft Gear Attachments.</b> Symington Co., The.</p> <p><b>Draft Gears.</b> American Steel Foundries. Bradford Corporation. Cardwell-Westinghouse Co. Edgewater Steel Co. Fort Pitt Malleable Iron Co. Miner, W. H. National Malleable &amp; Steel Castings Co. Standard Coupler Co. Union Draft Gear Co. Universal Draft Gear Attachment Co.</p> <p><b>Draft Yokes.</b> American Steel Foundries. Bettendorf Co., The. Buckeye Steel Castings Co. Gould Coupler Co., The. McConway &amp; Torley Co. Miner, W. H. Mt. Vernon Car Mfg. Co. National Malleable &amp; Steel Castings Co. Pressed Steel Car Co. Steel Car Forge Co. Symington Co., The. Universal Draft Gear Attachment Co.</p> <p><b>Drainage Gates, Automatic.</b> Armco Culvert Mfrs. Assoc. Republic Steel Corp.</p> <p><b>Drains, Perforated Iron.</b> Republic Steel Corp.</p>	<p><b>Drawbar Centering Device.</b> Gould Coupler Co., The. Miner, W. H.</p> <p><b>Drawbars, Unit Safety.</b> Franklin Railway Supply Co., Inc. Industrial Brownhoist Corp.</p> <p><b>Dredging Machinery.</b> Industrial Brownhoist Corp.</p> <p><b>Drilling Machines.</b> Sellers &amp; Co., Inc., Wm.</p> <p><b>Drilling Machines, Bonding.</b> Railroad Supply Co.</p> <p><b>Drilling Machines, Pneumatic.</b> Ingersoll-Rand Co.</p> <p><b>Drilling Machines, Rock.</b> General Electric Co. Ingersoll-Rand Co. Worthington Pump &amp; Machinery Corp.</p> <p><b>Drilling Machines, Upright and Radial.</b> Ryerson &amp; Son, Joseph T. Sellers &amp; Co., Inc., Wm.</p> <p><b>Drills.</b> Ingersoll-Rand Co.</p> <p><b>Drills, Close Corner.</b> Ingersoll-Rand Co.</p> <p><b>Drills, Concrete.</b> Ingersoll-Rand Co. Worthington Pump &amp; Machinery Corp.</p> <p><b>Drills, Steel Rock and Steel Sharpened.</b> Ingersoll-Rand Co. Worthington Pump &amp; Machinery Corp.</p> <p><b>Drills, Track &amp; Bending.</b> Bird-Archer Co., The. Ingersoll-Rand Co.</p> <p><b>Drive Gas Electric Coaches.</b> General Electric Co.</p> <p><b>Drive Gas Electric Locomotives.</b> Westinghouse Electric &amp; Mfg. Co.</p> <p><b>Driving Boxes (Extended Main).</b> Franklin Railway Supply Co., Inc.</p> <p><b>Drop Door Mechanism.</b> Wine Railway Appliance Co.</p> <p><b>Dynamos—(See Generators, Electric).</b></p> <p><b>Electrical Cable Accessories.</b> General Electric Supply Corp.</p> <p><b>Electric Cables.</b> American Steel &amp; Wire Co. Anaconda Wire &amp; Cable Co. General Electric Supply Corp.</p> <p><b>Electrical Instruments.</b> Electric Service Supplies Co. Railroad Supply Co. Westinghouse Elec. &amp; Mfg. Co.</p> <p><b>Electrical Supplies.</b> General Electric Co. General Electric Supply Corp. Graybar Electric Co. Westinghouse Elec. &amp; Mfg. Co.</p> <p><b>Electrification, Railroad.</b> Battey &amp; Kipp. General Electric Co. United Engineers &amp; Constructors, Inc. Westinghouse Elec. &amp; Mfg. Co.</p> <p><b>Electric Heaters.</b> General Electric Supply Corp.</p> <p><b>Electrical Insulation.</b> General Cable Corp. General Electric Supply Corp.</p> <p><b>Electrical Porcelain Insulators.</b> General Electric Supply Corp.</p> <p><b>Electric Motors.</b> General Electric Supply Corp.</p> <p><b>Electric Rivet Heaters.</b> General Electric Supply Corp.</p> <p><b>Electric Switches.</b> General Electric Supply Corp.</p> <p><b>Enamels.</b> Lowe Bros. Co., The. Sherwin-Williams Co.</p>	<p><b>End Frames, Cast Steel, Passenger Car.</b> General Steel Castings Corp.</p> <p><b>Ends, Steel.</b> Hutchins Car Rfg. Co. Union Metal Products Co.</p> <p><b>Engineers, Consulting, Civil, Elec., Hydraulic, Mechanical.</b> Battey &amp; Kipp. Hunt Co., Robt. W. Muhlfield, John E. United Engineers &amp; Constructors, Inc.</p> <p><b>Engineers, Contracting.</b> Battey &amp; Kipp. United Engineers &amp; Constructors, Inc.</p> <p><b>Engineers and Contractors.</b> Battey &amp; Kipp. Hunt Co., Robert W. Muhlfield, John E. United Engineers &amp; Constructors, Inc.</p> <p><b>Engineers, Construction.</b> Battey &amp; Kipp. Roberts &amp; Schaefer Co. United Engineers &amp; Constructors, Inc.</p> <p><b>Engineers and Contractors, Elec., Hydraulic, Mech.</b> Battey &amp; Kipp. Hunt Co., Robert W. Muhlfield, John E. Roberts &amp; Schaefer Co.</p> <p><b>Engineers, Inspecting.</b> Gulick-Henderson Co. Hunt Co., Robert W. Muhlfield, John E. Pittsburgh Testing Laboratory. United Engineers &amp; Constructors, Inc.</p> <p><b>Engineers, Valuation.</b> Hunt Co., Robert W. United Engineers &amp; Constructors, Inc.</p> <p><b>Engines, Crude &amp; Fuel Oil.</b> Fairbanks-Morse &amp; Co. Ingersoll-Rand Co. Worthington Pump &amp; Machinery Corp.</p> <p><b>Engines, Diesel.</b> Worthington Pump &amp; Machinery Corp.</p> <p><b>Engines, Gas.</b> Brill Co., The J. G. Worthington Pump &amp; Machinery Corp.</p> <p><b>Engines, Gas &amp; Gasoline.</b> American Car &amp; Foundry Motors Co. Fairbanks-Morse &amp; Co. Ingersoll-Rand Co. Worthington Pump &amp; Machinery Corp.</p> <p><b>Engines, Hoisting.</b> Industrial Brownhoist Corp. Orton Crane &amp; Shovel Co.</p> <p><b>Excavators.</b> Industrial Brownhoist Corp.</p> <p><b>Exhaust &amp; Heater Pipe.</b> Union Asbestos &amp; Rubber Co.</p> <p><b>Exhaust &amp; Ventilating Fans.</b> General Electric Supply Corp.</p> <p><b>Expanders, Tube.</b> Ryerson &amp; Son, Joseph T.</p> <p><b>Extinguishers, Fire.</b> Pyrene Mfg. Co., The</p> <p><b>Fans, Exhaust &amp; Ventilating.</b> General Electric Co. Graybar Electric Co. Westinghouse Elec. &amp; Mfg. Co.</p> <p><b>Fasteners, Car Door.</b> Camel Sales Co. Fort Pitt Malleable Iron Co. Miner, W. H. National Malleable &amp; Steel Castings Co.</p> <p><b>Feed Water Heater Systems.</b> Bird-Archer Co., The. Coffin, Jr., Co., The J. S. Worthington Pump &amp; Machinery Corp.</p> <p><b>Fencing Wire—(See Wire, Fence).</b></p> <p><b>Fence Posts, Treated.</b> American Steel &amp; Wire Co. Century Wood Preserving Co.</p> <p><b>Forgings.</b> American Bridge Co. American Steel Foundries. Baldwin Locomotive Works. The Bethlehem Steel Co.</p>	<p><b>Ferro Alloys.</b> Vanadium Corp. of America.</p> <p><b>Ferro, Chromium.</b> Vanadium Corp. of America.</p> <p><b>Ferro, Molybdenum.</b> Electro Metallurgical Sales Corp. Vanadium Corp. of America.</p> <p><b>Ferro, Silicon.</b> Vanadium Corp. of America.</p> <p><b>Ferro, Tungsten.</b> Vanadium Corp. of America.</p> <p><b>Ferro, Vanadium.</b> Vanadium Corp. of America.</p> <p><b>Filters, Air.</b> New York Air Brake Co. Westinghouse Air Brake Co.</p> <p><b>Filters, Water &amp; Industrial.</b> Graver Tank &amp; Mfg. Corp.</p> <p><b>Filtration Plants (Water).</b> Graver Tank &amp; Mfg. Corp.</p> <p><b>Fireboxes.</b> American Locomotive Co. Baldwin Locomotive Works.</p> <p><b>Fire Fighting &amp; Protection Equipment.</b> Johns-Manville Corp.</p> <p><b>Fittings, Air Brakes.</b> Westinghouse Air Brake Co.</p> <p><b>Fittings, Steam.</b> Vapor Car Heating Co., Inc.</p> <p><b>Fixtures, Car Door.</b> Camel Sales Co. Chicago Railway Equipment Co. Miner, W. H. National Malleable &amp; Steel Castings Co.</p> <p><b>Flangers, Snow.</b> Q &amp; C Co., The.</p> <p><b>Floodlights.</b> General Electric Supply Corp. Graybar Electric Co. Oxweld Railroad Service Co. Pyle-National Co. Symington Co., The. Westinghouse Elec. &amp; Mfg. Co.</p> <p><b>Floodlights, Acetylene.</b> Oxweld Railroad Service Co., The.</p> <p><b>Flooring.</b> Carey &amp; Co., Philip, The. Johns-Manville Corp.</p> <p><b>Flooring, Car.</b> Tuco Products Corp.</p> <p><b>Flooring, Coach.</b> Tuco Products Corp.</p> <p><b>Flooring, Composition.</b> Johns-Manville Corp. Tuco Products Corp.</p> <p><b>Flooring, Treated.</b> Central Coal &amp; Coke Co. Century Wood Preserving Co. Curtin-Howe Corp. National Lumber &amp; Creosoting Co.</p> <p><b>Floor Plates, Steel.</b> Carnegie Steel Co. Illinois Steel Co.</p> <p><b>Floor Slabs, Concrete.</b> American Cement Tile Mfg. Co.</p> <p><b>Flue Cleaners—(See Cleaners, Flue).</b></p> <p><b>Flue Cutters—(See Cutters, Flue).</b></p> <p><b>Flues, Boiler—(See Tubes, Boiler).</b></p> <p><b>Flue Shop Equipment.</b> Ryerson &amp; Son, Joseph T.</p> <p><b>Forges, Rivet Heating.</b> Ryerson &amp; Son, Joseph T.</p> <p><b>Forging Hammers.</b> Industrial Brownhoist Corp.</p>
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<p>Brill Co., The J. G. Carnegie Steel Co. Edgewater Steel Co. General Railway Signal Co. Gould Coupler Co., The. Illinois Steel Co. Midvale Co., The. Mt. Vernon Car Mfg. Co. Neely Nut &amp; Bolt Co. Pressed Steel Car Co. Standard Steel Works Co. Steel Car Forge Co. Universal Draft Gear Attachment Co.</p> <p>Forgings, Drop. Baldwin Locomotive Works, The. Brill Co., The J. G. General Railway Signal Co. Steel Car Forge Co. Union Switch &amp; Signal Co. Forgings, Monel Metal. International Nickel Co., The.</p> <p>Foundry Supplies. Bird-Archer Co., The. Frames, Cast Steel Locomotive. General Steel Castings Corp.</p> <p>Frames, Locomotive. American Steel Foundries. American Locomotive Co. Baldwin Locomotive Works. Birdsboro Steel Foundry &amp; Machine Co. Ohio Steel Foundry Co., The. Union Steel Casting Co.</p> <p>Frames, Truck. American Locomotive Co. American Steel Foundries. Baldwin Locomotive Works. Bettendorf Co., The. Birdsboro Steel Foundry &amp; Machine Co. Buckeye Steel Castings Co. Brill Co., The J. G. Franklin Railway Supply Co., Inc. Gould Coupler Co., The. Ohio Steel Foundry Co., The. Pressed Steel Car Co. Pyle-National Co. Symington Co., The.</p> <p>Frames, Vanadium. American Locomotive Co. Baldwin Locomotive Works. Birdsboro Steel Foundry &amp; Machine Co. Union Steel Casting Co.</p> <p>Frogs and Crossings. Bethlehem Steel Co. Ramapo Ajax Corp.</p> <p>Fulcrums, Brake Beam. American Steel Foundries. Brill Co., The J. G. Chicago Railway Equipment Co. National Malleable &amp; Steel Castings Co.</p> <p>Furnaces, Electric. General Electric Co. Westinghouse Elec. &amp; Mfg. Co.</p> <p>Furnaces, Gasoline. Railroad Supply Co.</p> <p>Furnaces, Rivet Heating—(See Forges, Rivet Heating).</p> <p>Furniture. Aluminum Co. of America.</p> <p>Gage Testers—(See Testers, Gage).</p> <p>Gages, Air. Westinghouse Air Brake Co.</p> <p>Gages, Oxy-Acetylene. Oxweld Railroad Service Co., The.</p> <p>Gages, Steam. Ashton Valve Co.</p> <p>Gages, Tire. Schrader's Son, Inc., A.</p> <p>Gages, Wheel Press Recording. Ashton Valve Co.</p> <p>Gaskets. Westinghouse Air Brake Co.</p> <p>Gasoline. Ethyl Gasoline Corp.</p> <p>Gear Blanks, Rolled Steel. Edgewater Steel Co. Standard Steel Works Co.</p> <p>Gears and Pinions. American Steel Foundries. Westinghouse Elec. &amp; Mfg. Co.</p>	<p>Gears, Silent. General Electric Co. Westinghouse Elec. &amp; Mfg. Co.</p> <p>Gears, Valve — (See Valve Gears).</p> <p>Generators, Acetylene. Oxweld Railroad Service Co.</p> <p>Generators, Car Lighting. Safety Car Heating &amp; Lighting Co.</p> <p>Generators, Electric. Fairbanks-Morse &amp; Co. General Electric Co. Graybar Electric Co. Sunbeam Electric Mfg. Co. Westinghouse Elec. &amp; Mfg. Co.</p> <p>Goggles, Welding. Oxweld Railroad Service Co., The. Sunbeam Electric Mfg. Co.</p> <p>Graders, Elevating. Western Wheeled Scraper Co.</p> <p>Grapples, Wood. Industrial Brownhoist Corp.</p> <p>Grate Bars. Q &amp; C Co., The.</p> <p>Grate Shakers, Automatic. Franklin Railway Supply Co., Inc.</p> <p>Grates. Firebar Corp. Grease Forming Machines. Franklin Railway Supply Co., Inc.</p> <p>Grey Iron. American Brake Shoe &amp; Foundry Co.</p> <p>Grinders, Internal. Micro Machine Co.</p> <p>Grinders, Portable Crank Pin. Micro Machine Co.</p> <p>Grinding Machines. Sellers &amp; Co., Inc., Wm. Grinding Machines, Portable. Ingersoll-Rand Co. Ryerson &amp; Son, Inc., Joseph T.</p> <p>Guard Rails, Treated. Curtin-Howe Corp. International Creosoting &amp; Construction Co.</p> <p>Guard Rails, Foot Guard. Q &amp; C Co., The.</p> <p>Guard Rails (One Piece). Bethlehem Steel Co. Ramapo Ajax Corp.</p> <p>Guard Switch Point. Q &amp; C Co., The.</p> <p>Guards, Cattle. American Bridge Co.</p> <p>Guards, Dust. Gould Coupler Co., The. Symington Co., The.</p> <p>Hair Felt. Johns-Manville Corp.</p> <p>Hammers, Pneumatic. Ingersoll-Rand Co.</p> <p>Hammers, Riveting. Ingersoll-Rand Co.</p> <p>Hammers, Steam. Industrial Brownhoist Corp. Sellers &amp; Co., Inc., Wm.</p> <p>Hand Brakes—(See Brakes, Hand).</p> <p>Hangers, Ball Bearing. S. K. F. Industries, Inc.</p> <p>Hand Rails &amp; Fittings. Aluminum Co. of America.</p> <p>Hangers, Bottom Rod Safety. Chicago Railway Equipment Co.</p> <p>Hangers, Car Door—(See Fixtures, Car Door).</p> <p>Headgates, Sliding. Armco Culvert Manufacturers Association.</p> <p>Headlight Repair Parts, Electric. Electric Service Supplies Co. Pyle-National Co. Sunbeam Electric Mfg. Co.</p> <p>Headlights, Electric. General Electric Co. Pyle-National Co., The. Sunbeam Electric Mfg. Co. Westinghouse Electric &amp; Mfg. Co.</p> <p>Headlights, Reflectors &amp; Cases. Pyle-National Co. Sunbeam Electric Mfg. Co.</p> <p>Heaters, Electric. Gold Car Heating &amp; Lighting Co. Westinghouse Electric &amp; Mfg. Co.</p>	<p>Heaters, Feedwater. Graver Tank &amp; Mfg. Corp.</p> <p>Heaters, Feedwater Locomotive. Coffin Co., Jr., The J. S. Superheater Company, The. Worthington Pump &amp; Machinery Corp.</p> <p>Heaters, Feed Water, Stationary. Brill Co., The J. G. Worthington Pump &amp; Machinery Corp.</p> <p>Heating &amp; Ventilating Apparatus. Gold Car Heating &amp; Lighting Co. Vapor Car Heating Co., Inc. Westinghouse Electric &amp; Mfg. Co.</p> <p>Heating Equipment, Car. Gold Car Heating &amp; Lighting Co. Safety Car Htg. &amp; Ltg. Co. Vapor Car Heating Co., Inc. Wine Railway Appliance Co.</p> <p>Heating Systems, Car (Electric and Steam). Gold Car Heating &amp; Lighting Co. Safety Car Htg. &amp; Ltg. Co. Vapor Car Heating Co., Inc. Wine Railway Appliance Co.</p> <p>High Temperature Cements. Carey &amp; Co., Philip, The.</p> <p>Highway Crossing Protection Devices. American Bridge Co. Franklin Railway Supply Co., Inc. Griswold Signal Co. Railroad Supply Co.</p> <p>Hoists, Chain. Milwaukee Electric Crane &amp; Hoist Corp. Ryerson &amp; Son, Jos. T.</p> <p>Hoists, Electric. Milwaukee Electric Crane &amp; Hoist Corp.</p> <p>Hoists, Pneumatic. Ingersoll-Rand Co.</p> <p>Hoists, Second-Hand. Hyman-Michaels Co.</p> <p>Hoisting Machinery. Industrial Brownhoist Corp. Milwaukee Electric Crane &amp; Hoist Corp. Orton Crane &amp; Shovel Co.</p> <p>Hooks, Wrecking. National Malleable &amp; Steel Castings Co.</p> <p>Horns, Pneumatic. Westinghouse Air Brake Co.</p> <p>Hose, Air, Steam, Etc. Ingersoll-Rand Co. Westinghouse Air Brake Co. Worthington Pump &amp; Machinery Corp.</p> <p>Hose, Oxy-Acetylene. Oxweld Railroad Service Co., The.</p> <p>Hose, Tender. Westinghouse Air Brake Co.</p> <p>Incandescent Lamps. General Electric Supply Corp.</p> <p>Indicators, Speed &amp; Cut-off. Valve Pilot Co.</p> <p>Ingot. Birdsboro Steel Foundry &amp; Machine Co. Carnegie Steel Co. Edgewater Steel Co. Illinois Steel Co. McConway &amp; Torley Co. Standard Steel Works Co.</p> <p>Injectors, Exhaust Steam. Sellers &amp; Co., Inc., Wm. Superheater Co., The.</p> <p>Inspection of Material and Equipment—(See Engineers, Inspection).</p> <p>Insulated Wire. American Steel &amp; Wire Co. Anaconda Wire &amp; Cable Co. General Electric Supply Corp.</p>	<p>Insulation, Car. Carey Co., Philip, The.</p> <p>Insulation, Car, Bldg. Carey Co., Philip, The. Johns-Manville Corp. Lehon Co., The. Tucco Products Corp. Union Asbestos &amp; Rubber Co.</p> <p>Insulation, Electrical. General Electric Co. Westinghouse Elec. &amp; Mfg. Co.</p> <p>Insulation, Exhaust &amp; Heater Pipe. Carey Co., Philip, The. Johns-Manville Corp. Tucco Products Corp. Union Asbestos &amp; Rubber Co.</p> <p>Insulation, Heat. Carey Co., Philip, The. Miner, W. H.</p> <p>Insulation Tape. General Electric Supply Corp.</p> <p>Insulators, Electrical, Porcelain. Graybar Electric Co. Westinghouse Elec. &amp; Mfg. Co.</p> <p>Interlocking Plant Equipment. General Railway Signal Co. Union Switch &amp; Signal Co.</p> <p>Iron Chain. Falls Hollow Staybolt Co. Lockhart Iron &amp; Steel Co. Ryerson &amp; Son, Joseph T.</p> <p>Iron, Charcoal. Bethlehem Steel Co. Ewald Iron Co. Falls Hollow Staybolt Co. Lockhart Iron &amp; Steel Co. Ryerson &amp; Son, Joseph T.</p> <p>Iron, Engine Bolt. Lockhart Iron &amp; Steel Co. Ryerson &amp; Son, Joseph T.</p> <p>Iron, Forging Billets. Lockhart Iron &amp; Steel Co.</p> <p>Iron, Hollow Staybolt. Falls Hollow Staybolt Co. Ryerson &amp; Son, Joseph T.</p> <p>Iron, Hollow Staybolt Bars. Bethlehem Steel Co. Falls Hollow Staybolt Co. Ryerson &amp; Son, Joseph T.</p> <p>Iron, Pig. Bethlehem Steel Co.</p> <p>Iron, Refined. Ewald Iron Co. Falls Hollow Staybolt Co. Lockhart Iron &amp; Steel Co. Reading Iron Co. Ryerson &amp; Son, Joseph T.</p> <p>Iron, Staybolt—(See also Staybolts). Ewald Iron Co. Falls Hollow Staybolt Co. Lockhart Iron &amp; Steel Co. Reading Iron Co. Ryerson &amp; Son, Joseph T.</p> <p>Jacking, Locomotive. Carey Co., Philip, The.</p> <p>Jacking Method of Installing Pipe. Armco Culvert Manufacturers Association.</p> <p>Jacks, Smoke. Carey Co., Philip, The. Johns-Manville Corp.</p> <p>Joints, Air Reservoir. Barco Mfg. Co. Franklin Railway Supply Co., Inc.</p> <p>Joints, Blow Off Line (Round-house). Barco Mfg. Co. Franklin Railway Supply Co., Inc.</p> <p>Joints, Coach and Coach Yard. Barco Mfg. Co. Franklin Railway Supply Co., Inc.</p> <p>Joints, Flexible. Franklin Railway Supply Co., Inc. Vapor Car Heating Co., Inc.</p> <p>Joints, Flexible Ball. Barco Mfg. Co.</p> <p>Joints, Rail. American Steel Foundries. Carnegie Steel Co. Illinois Steel Co. Q &amp; C Co., The. Rail Joint Co. Union Switch &amp; Signal Co.</p>	<p>Joints, Steam, Air &amp; Liquid. Barco Mfg. Co. Franklin Railway Supply Co., Inc. Vapor Car Heating Co., Inc.</p> <p>Joints, Swing. Barco Mfg. Co. Vapor Car Heating Co., Inc.</p> <p>Journal Boxes and Lids. Allegheny Steel Co. American Steel Foundries. Brill Co., The J. G. Gould Coupler Co., The. Hunt-Spiller Mfg. Corp. National Malleable &amp; Steel Castings Co. Pullman Car &amp; Mfg. Corp. Railway Steel Spring Co. Symington Co., The. Union Spring &amp; Mfg. Co. Journal Oilers, Car &amp; Locomotive. Ardeo Mfg. Co.</p> <p>Keys, Brake Shoe. Bradford Corporation. Mt. Vernon Car Mfg. Co. Steel Car Forge Co. Union Spring &amp; Mfg. Co.</p> <p>Knuckles, Emergency. Q &amp; C Co., The.</p> <p>Laboratories, Testing. Hunt Co., Robert W. Pittsburgh Testing Laboratory.</p> <p>Lacquers. General Electric Supply Corp. Sherwin-Williams Co.</p> <p>Ladders, Steel Car. Wine Railway Appliance Co.</p> <p>Lagging, Locomotive. Carey &amp; Co., Philip, The. Johns-Manville Corp.</p> <p>Lamps, Incandescent. General Electric Co. Graybar Electric Co. Westinghouse Elec. &amp; Mfg. Co.</p> <p>Lamps, Inspector's. Oxweld Railroad Service Co., The.</p> <p>Lath, Metal. Armco Railroad Sales Co.</p> <p>Lathes, Axle. Sellers &amp; Co., Inc., Wm.</p> <p>Lathes, Engine. Ryerson &amp; Son, Joseph T.</p> <p>Lathes, Wheel. Sellers &amp; Co., Inc., Wm.</p> <p>Lead, White. National Lead Co.</p> <p>Lighting Equipment, Car. Electric Storage Battery Co. Safety Car Htg. &amp; Ltg. Co.</p> <p>Lighting Fixtures and Systems. General Electric Supply Corp. Graybar Electric Co. Pyle-National Co. Safety Car Htg. &amp; Ltg. Co.</p> <p>Lighting Plants, Gas, Electric. Pyle-National Co., The. Sunbeam Electric Mfg. Co.</p> <p>Lightning Arresters. General Electric Supply Corp.</p> <p>Line Material. Graybar Electric Co. Westinghouse Elec. &amp; Mfg. Co.</p> <p>Lock Nuts—(See Nut Locks).</p> <p>Locomotive Jacket Sheets. Armco Railroad Sales Co.</p> <p>Locomotive Water Conditioners. Bird-Archer Co., The.</p> <p>Locomotives, Contractors. American Locomotive Co. Baldwin Locomotive Works. Lima Locomotive Works.</p> <p>Locomotives, Electric. American Locomotive Co. Baldwin Locomotive Works. General Electric Co. Westinghouse Elec. &amp; Mfg. Co.</p> <p>Locomotives, Gasoline. Baldwin Locomotive Works.</p> <p>Locomotives, Gas-Electric. Brill Co., The J. G. Electro-Motive Co.</p> <p>Locomotives, Geared. Lima Locomotive Works.</p>
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<b>Locomotives, Industrial.</b> American Locomotive Co. Baldwin Locomotive Works. General Electric Co. Lima Locomotive Works. Westinghouse Elec. & Mfg. Co. <b>Locomotives, Mine.</b> American Locomotive Co. Baldwin Locomotive Works. General Electric Co. Lima Locomotive Works. Westinghouse Elec. & Mfg. Co. <b>Locomotives, Oil Engine, Electric Driven.</b> American Locomotive Co. Baldwin Locomotive Works. General Electric Co. Ingersoll-Rand Co. Westinghouse Elec. & Mfg. Co. Whitcomb Locomotive Co., The. <b>Locomotives, Rebuilt.</b> American Locomotive Co. <b>Locomotives, Repair Parts.</b> American Locomotive Co. Baldwin Locomotive Works. Lima Locomotive Works. <b>Locomotives, Second-Hand.</b> Hyman-Michaels Co. <b>Locomotives, Steam.</b> American Locomotive Co. Baldwin Locomotive Works. Lima Locomotive Works. <b>Locomotive Stokers.</b> Standard Stoker Co. <b>Locomotive Valve Pilot.</b> Valve Pilot Co. <b>Lubricators, Driving Box.</b> Franklin Railway Supply Co., Inc. <b>Lubricators, Piston Rod.</b> Q & C Co., The. <b>Lumber, Asbestos.</b> Carey & Co., Philip, The. Johns-Manville Corp. <b>Lumber, Treated.</b> American Creosoting Co. Central Coal & Coke Co. Century Wood Preserving Co. Curtin-Howe Corp. Industrial Lumber & Creosoting Co. International Creosoting & Construction Co. National Lumber & Creosoting Co. Southern Wood Preserving Co. <b>Machinery, Hydraulic.</b> Birdsboro Steel Foundry & Mach. Co. <b>Machine Screws, Monel Metal</b> International Nickel Co., The. <b>Magnets, Lifting.</b> Industrial Brownhoist Corp. Electro Metallurgical Sales Corp. <b>Mechanical Draft Apparatus—</b> (See Heating and Vent. App.). <b>Mechanical Stokers.</b> Standard Stoker Co. <b>Melters, Snow, Electric.</b> Q & C Co., The. <b>Metallic Flexible Conduit.</b> General Electric Supply Corp. <b>Meters, Water &amp; Oil.</b> Worthington Pump & Machinery Corp. <b>Milling Machines, Planer Type.</b> Sellers & Co., Inc., Wm. <b>Milling Machines, Plain and Universal.</b> Ryerson & Son, Joseph T. <b>Milling Machines, Portable Frame Jaw.</b> Micro Machine Co. <b>Mohair Upholstery Velvets.</b> Chase & Co., L. C. Massachusetts Mohair Plush Co. <b>Molybdenum Metal.</b> Vanadium Corp. of America. <b>Monel Metal, Rods, Sheets, Tubes, Wire, etc.</b> International Nickel Co., The. <b>Motors, Electric.</b> Fairbanks-Morse & Co. General Electric Co. Graybar Electric Co. Westinghouse Elec. & Mfg. Co.	<b>Motors &amp; Generators.</b> Fairbanks-Morse & Co. <b>Moulding.</b> Aluminum Co. of America. <b>Multiple V Belt Drives.</b> Worthington Pump & Machinery Corp. <b>Nails.</b> American Steel & Wire Co. Reading Iron Co. Ryerson & Son, Joseph T. <b>Nipples, Air Hose.</b> Prime Manufacturing Co. <b>Nozzles, Exhaust.</b> Franklin Railway Supply Co., Inc. <b>Nozzles, Oxy-Acetylene Cutting.</b> Oxweld Railroad Service Co., The. <b>Nuts—(See Bolts and Nuts).</b> <b>Nut Locks.</b> Dardelet Threadlock Corp. Grip Nut Co. <b>Nuts, Tank Hose.</b> Prime Manufacturing Co., The. <b>Office Appliances.</b> Remington-Rand Business Service. <b>Oil-Electric Locomotives.</b> American Locomotive Co. General Electric Co. Ingersoll-Rand Co. Westinghouse Elec. & Mfg. Co. <b>Oil Filtering &amp; Storage Systems.</b> Graver Tank & Mfg. Corp. <b>Oil, Linseed.</b> National Lead Co. <b>Oil Plugs, Steam Chest.</b> Franklin Railway Supply Co., Inc. <b>Oxy-Acetylene Apparatus.</b> Oxweld Railroad Service Co., The. <b>Oxygen.</b> Oxweld Railroad Service Co., The. <b>Packing.</b> Westinghouse Air Brake Co. <b>Packing, Air Pump.</b> Johns-Manville Corp. <b>Pilot Packing Co.</b> Union Asbestos & Rubber Co. Westinghouse Air Brake Co. <b>Packing, Asbestos.</b> <b>Packing, Cylinder and Valve Ring.</b> Johns-Manville Corp. Hunt-Spiller Mfg. Corp. Westinghouse Air Brake Co. <b>Packing, Locomotive Cab Cock.</b> Johns-Manville Corp. Union Asbestos & Rubber Co. <b>Packing, Ring Boiler.</b> Union Asbestos & Rubber Co. <b>Packing, Rubber.</b> <b>Packing, Semi-Metallic.</b> Pilot Packing Co. Central Alloy Steel Corp. <b>Packing, Sheet.</b> Johns-Manville Corp. Union Asbestos & Rubber Co. <b>Packing, Soft.</b> Carey & Co., Philip, The. Johns-Manville Corp. Pilot Packing Co. Union Asbestos & Rubber Co. <b>Packing, Throttle.</b> Johns-Manville Corp. Union Asbestos & Rubber Co. <b>Packing Valve Stem.</b> <b>Paint Burners, Acetylene.</b> Oxweld Railroad Service Co., The. <b>Paint, Metal Protective.</b> Lowe Bros. Co., The. National Lead Co. Sherwin-Williams Co. <b>Paint, Powder.</b> Aluminum Co. of America. <b>Paint Spraying Equipment.</b> De Vilbiss Mfg. Co., The.	<b>Paints.</b> Lowe Bros. Co., The. National Lead Co. Sherwin-Williams Co. <b>Paper, Carbon.</b> Remington-Rand Business Service. <b>Paper, Sheathing.</b> Carey & Co., Philip, The. <b>Patterns, for Iron, Steel &amp; Brass Castings.</b> Baldwin Locomotive Works, The. <b>Pavement Breakers.</b> Ingersoll-Rand Co. Worthington Pump & Machinery Corp. <b>Pickling Equipment, Monel Metal.</b> International Nickel Co., The. <b>Pile Drivers.</b> Industrial Brownhoist Corp. Orton Crane & Shovel Co. <b>Piling, Treated.</b> American Creosoting Co. Century Wood Preserving Co. Curtin-Howe Corp. International Creosoting & Construction Co. National Lumber & Creosoting Co. <b>Piling, Sheet Steel.</b> American Bridge Co. Carnegie Steel Co. <b>Pilot Beams, Cast Steel.</b> General Steel Castings Corp. Gould Coupler Co., The. <b>Pilots, Cast Steel.</b> General Steel Castings Corp. Locomotive Finished Material Co. <b>Pins, Air Brake &amp; Clevis.</b> Champion Rivet Co. <b>Pins, Center.</b> Miner, W. H. <b>Pins, Coupler Knuckle.</b> Champion Rivet Co. McConway & Torley Co. National Malleable & Steel Castings Co. <b>Pins, Crank.</b> American Locomotive Co. Baldwin Locomotive Works. Miner, Inc., W. H. Standard Steel Works Co. Union Asbestos & Rubber Corp. <b>Pipe, Corrugated Iron</b> Armco Culvert Manufacturers Association <b>Pipe, Paved Invert</b> Armco Culvert Manufacturers Association <b>Pipe Coverings.</b> Carey & Co., Philip, The. Johns-Manville Corp. Keasby & Mattison Co. <b>Pipe Fittings—(See Fittings, Pipe).</b> <b>Pipe, Metal Culvert.</b> Armco Railroad Sales Co. American Sheet & Tin Plate Co. Republic Steel Corp. <b>Pipe, Perforated Iron</b> Armco Culvert Manufacturers Association <b>Pipe, Spiral Welded.</b> Armco Railroad Sales Co. <b>Pipe, Steel Signal.</b> National Tube Co. <b>Pipe, Spiral Welded.</b> Armco Railroad Sales Co. <b>Pipe, Wrought Iron.</b> Byers Co., A. M. Reading Iron Co. <b>Planers, Plate.</b> Ryerson & Son, Jos. T. Sellers & Co., Inc., Wm. <b>Plates.</b> <b>Steel Car Forge Co.</b> <b>Steel Car Forge Co.</b> <b>Plates, Boiler, Firebox—(See Steel Firebox).</b> <b>Plates, Center—(See Bearings, Center).</b> <b>Plates, Iron &amp; Steel.</b> Armco Railroad Sales Co. Carnegie Steel Co. Illinois Steel Co. Inland Steel Co. Ryerson & Son, Joseph T. <b>Plate &amp; Sheet Metal Work.</b> Baldwin Locomotive Works, The. <b>Plates, Tie.</b> Illinois Steel Co. Inland Steel Company. Railroad Supply Co. Tennessee Coal, Iron & Railroad Co.	<b>Plates, Tin and Terne.</b> American Sheet & Tin Plate Co. <b>Platforms, Car.</b> Gould Coupler Co., The. Standard Coupler Co. <b>Platforms, Cast Steel, Passenger Car.</b> General Steel Castings Corp. <b>Plows, Railroad and Grading.</b> Western Wheeled Scraper Co. <b>Plows, Snow.</b> American Locomotive Co. Brill Co., The J. G. Q & C Co., The. <b>Plush, Mohair.</b> Chase & Co., L. C. Massachusetts Mohair Plush Co. <b>Pneumatic Tools.</b> Ingersoll-Rand Co. <b>Poles, Signal.</b> American Creosoting Co. Century Wood Preserving Co. Curtin-Howe Corp. General Railway Signal Co. International Creosoting & Construction Co. National Lumber & Creosoting Co. Southern Wood Preserving Co. Union Switch & Signal Co. <b>Poles, Treated.</b> American Creosoting Co. Central Coal & Coke Co. Century Wood Preserving Co. General Electric Supply Corp. Curtin-Howe Corp. Graybar Electric Co. International Creosoting & Construction Co. National Lumber & Creosoting Co. Southern Wood Preserving Co. <b>Poles, Steel Tubular.</b> Graybar Electric Co. National Tube Co. <b>Posts, Fence, Treated.</b> Century Wood Preserving Co. Curtin-Howe Corp. Inland Steel Co. International Creosoting & Construction Co. National Lumber & Creosoting Co. Southern Wood Preserving Co. <b>Posts, Steel Fence.</b> American Steel & Wire Co. Q & C Co., The. <b>Powder, Blasting—(See Explosives).</b> <b>Powdered Coal Equipment.</b> Muhlfeld, John E. <b>Power Plants.</b> General Electric Co. Muhlfeld, John E. United Engineers & Constructors, Inc. Westinghouse Elec. & Mfg. Co. <b>Power Transmission Supplies.</b> Sellers & Co., Inc., Wm. <b>Preservatives, Wood.</b> Century Wood Preserving Co. Curtin-Howe Corp. National Lumber & Creosoting Co. <b>Presses, Flanging Hydraulic.</b> Birdsboro Steel Foundry & Machine Co. <b>Presses, Hydraulic.</b> Baldwin-Southwark Corp. Birdsboro Steel Foundry & Machine Co. <b>Presses, Wheel.</b> Birdsboro Steel Foundry & Machine Co. Sellers & Co., Inc., Wm. <b>Pulverizers, Coal—(See Crushers, Coal).</b> <b>Pumping Stations.</b> Fairbanks-Morse & Co.	<b>Pump Liners, Monel Metal.</b> International Nickel Co., The. <b>Pump Rods, Monel Metal.</b> International Nickel Co., The. <b>Pump Shafts, Monel Metal.</b> International Nickel Co., The. <b>Pumps, Hydraulic.</b> Ingersoll-Rand Co. Worthington Pump & Machinery Corp. <b>Pumps &amp; Pumping Mch.</b> Fairbanks-Morse & Co. Ingersoll-Rand Co. Westinghouse Air Brake Co. Worthington Pump & Machinery Corp. <b>Pumps, Vacuum.</b> Ingersoll-Rand Co. Worthington Pump & Machinery Corp. <b>Punching and Shearing Machines.</b> Ryerson & Son, Joseph T. <b>Pushers, Coal.</b> Standard Stoker Co. <b>Pyrometers, Superheated Steam.</b> Superheater Co., The. <b>Rail Anchors.</b> Bethlehem Steel Co. P. & M. Co., The. <b>Rail-Bonds.</b> American Steel & Wire Co. General Electric Co. General Railway Signal Co. Graybar Electric Co. Railroad Supply Co. Union Switch & Signal Co. Westinghouse Elec. & Mfg. Co. <b>Rail Braces—(See Braces, Rail).</b> <b>Rail Reclamation Equipment.</b> Ryerson & Son, Joseph T. <b>Railroad Shops.</b> United Engineers & Constructors, Inc. <b>Rail Splice Plates—(See Joints, Rail).</b> <b>Railroad Structures—(See Engineers and Contractors; also Building).</b> <b>Rails.</b> Bethlehem Steel Co. Carnegie Steel Co. Hyman-Michaels Co. Illinois Steel Co. Inland Steel Co. Ryerson & Son, Inc., Joseph T. Tennessee Coal, Iron & Railroad Co. Thomson Rail Corp. <b>Rails, Relaying.</b> Hyman-Michaels Co. <b>Railway Signals.</b> General Electric Supply Corp. <b>Rattan.</b> Hale-Kilburn Co. Heywood-Wakefield Co. <b>Receivers, Air.</b> Ingersoll-Rand Co. Westinghouse Air Brake Co. <b>Recorders, Speed &amp; Cut-off.</b> Valve Pilot Co. <b>Rectifiers for Signal Work.</b> General Electric Co. Railroad Supply Co. Union Switch & Signal Co. <b>Reducing Valves.</b> Vapor Car Heating Co., Inc. <b>Reflectors, Headlight.</b> Pyle-National Co., The. Sunbeam Electric Mfg. Co. <b>Refrigerators.</b> Wine Railway Appliance Co. <b>Regulators, Oxy-Acetylene.</b> Oxweld Railroad Service Co., The. <b>Relays.</b> General Railway Signal Co. Railroad Supply Co. Union Switch & Signal Co. Westinghouse Elec. & Mfg. Co.
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Removers, Paint & Varnish. Oakite Products, Inc.	Saws, Portable Rail. Industrial Brownhoist Corp. Q & C Co., The.	Siding, Bldg., Car, Corru- gated & Plain. Kinnear Mfg. Co. Armco Railroad Sales Co. American Sheet & Tin Plate Co. Inland Steel Co. Ryerson & Son, Inc., Joseph T.	Springs, Vanadium Steel. Pittsburgh Spring & Steel Co. Union Spring & Mfg. Co.	Switch Boards. Graybar Electric Co. Johns-Manville Corp. Westinghouse Elec. & Mfg. Co.
Repair Parts, Stoker. Standard Stoker Co. Q & C Company, The.	Scales. Fairbanks-Morse & Co.	Signal Accessories. Electric Storage Battery Co. General Electric Co. General Railway Signal Co. Graybar Electric Co. Railroad Supply Co. Union Switch & Signal Co. Westinghouse Elec. & Mfg. Co.	Stacks, Steel. American Bridge Co. Graver Tank & Mfg. Corp.	Switch Machines. General Railway Signal Co.
Retorts, Creosoting. Graver Tank & Mfg. Corp.	Scrapers, Wheeled and Drag. Western Wheeled Scraper Co.	Signals, Corrugated & Plain. Carey & Co., Philip, The. Johns-Manville Corp.	Stands, Switch & Target. Q & C Co., The.	Switch Movements. Union Switch & Signal Co.
Reverse Gear, Power. Barco Mfg. Co. Franklin Railway Supply Co., Inc.	Screens, Passenger Car. Tuco Products Corp.	Signal Blades. General Railway Signal Co. Union Switch & Signal Co.	Staybolts. American Locomotive Co. Ewald Iron Co. Falls Hollow Staybolt Co. Ryerson & Son, Joseph T.	Switch Ties, Treated. American Creosoting Co. Century Wood Preserving Co. Curtin-Howe Corp. International Creosoting & Construction Co. National Lumber & Creos- oting Co. Southern Wood Preserving Co.
Rivet Cutters. Ingersoll-Rand Co.	Seats, Car. Brill Co., The J. G. Hale-Kilburn Co. Heywood-Wakefield Co.	Signals, Crossing. Union Switch & Signal Co.	Staybolts, Hollow. Falls Hollow Staybolt Co. Ryerson & Son, Joseph T.	Switches, Electric. Electric Service Supplies Co. General Electric Co. Graybar Electric Co. Westinghouse Elec. & Mfg. Co.
Riveters, Hydraulic. Birdsboro Steel Foundry & Machine Co.	Seats, Coach. Brill Co., The J. G.	Signals, Crossing Protection. General Railway Signal Co. Railroad Supply Co.	Steam Chests. Franklin Railway Supply Co., Inc.	Switches & Switch Stands. Ramapo Ajax Corp.
Riveting Machines. Ingersoll-Rand Co.	Shafting. Falls Hollow Staybolt Co. Ryerson & Son, Joseph T. Sellers & Co., Inc., Wm. Standard Steel Works Co.	Sign Posts, Treated. Century Wood Preserving Co. National Lumber & Creos- oting Co.	Steam Enclosures, Corru- gated Iron. Republic Steel Corp.	Syphons, Corrugated Iron. Republic Steel Corp.
Rivets. Inland Steel Co. Neely Nut & Bolt Co. Ryerson & Son, Joseph T. Pressed Steel Car Co. Russell, Burdall & Ward Bolt and Nut Co.	Shapers. Ryerson & Son, Joseph T.	Signs, Highway Crossing. Railroad Supply Co.	Steam Shovels. Orton Crane & Shovel Co.	Syphons, Locomotive. Locomotive Firebox Co.
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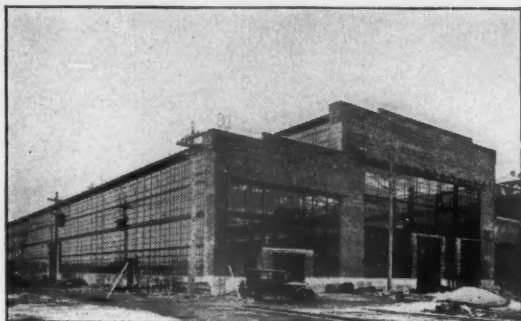
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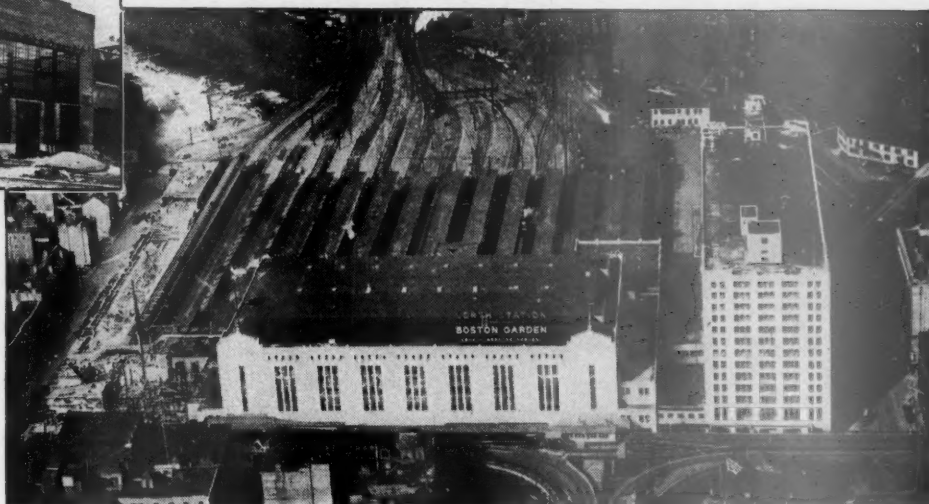
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And there is absolutely no need of taking any chances. *Brake Drums* made of HUNT-SPILLER *Air Furnace* GUN IRON insure positive control in any emergency — they always retain that smooth surface which is imperative to maximum braking efficiency.

*Brake Drums* made of HUNT-SPILLER *Air Furnace* GUN IRON will not cut, score or grab. The savings in maintenance pay a big return on the investment.

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